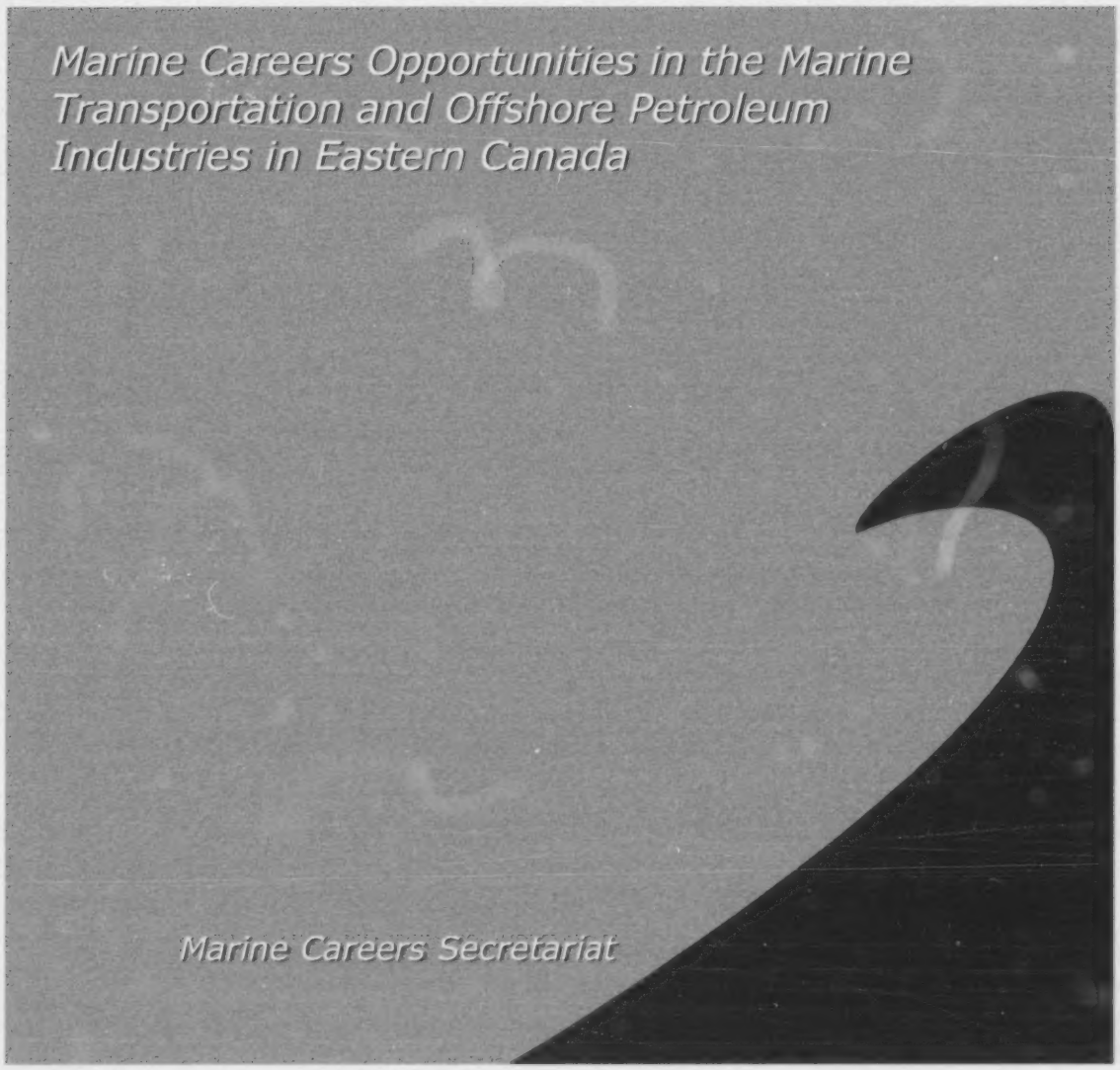
Canada

GOVERNMENT OF NEWFOUNDLAND AND LABRADOR

GOUVERNEMENT de TERRE-NEUVE ET LABRADOR

Marine Careers Opportunities in the Marine Transportation and Offshore Petroleum Industries in Eastern Canada



Marine Careers Secretariat

Strategic Directions Inc. (SDI) has prepared this Report for the Marine Careers Secretariat (MCS) based in part upon information provided by MCS and others. While SDI believes such information to be reliable, it cannot warrant it. The reader assumes responsibility for decisions made or actions taken based upon this Report.

Strategic Directions Inc.

SDI would like to acknowledge the outstanding commitment of time and insight provided by:

- Mike Keefe, Manager Examinations and Enforcement, Transport Canada, Marine Safety, Atlantic Region for providing the data regarding marine certificate holders, and information on the engineering and deck officer career paths;
- Gerard Fardy, Human Resources and Skills Development Canada for obtaining the Employment Insurance information, and providing advice on and reviewing the analysis;
- Jacquie Butler, Human Resources and Skills Development Canada for providing input on the National Occupation Classification and other labour force information; and
- Members of the Marine Careers Secretariat Working Group.
    - John Connors, Chair, Marine Careers Secretariat
    - Derrick Barrett, Department of Education, Government of Newfoundland and Labrador
    - Jean Bishop, Women's Policy Office, Government of Newfoundland and Labrador
    - Bernie Brockerville, Marine Institute
    - Paul Dinn, Human Resources, Labour and Employment, Government of Newfoundland and Labrador
    - Catherine Dutton, Marine Institute
    - Tom Hawco, Human Resources and Skills Development Canada
    - Gerald Puddister, Puddister Trading
    - Capt. Rick Strong, Seabase/Maersk
    - Kim Thornhill, Marine Institute

Table of Contents

Executive Summary 1

1.0 Introduction 15

2.0 Study Scope, Methodology and Limitations 15
- 2.1 Study Scope 15
- 2.2 Study Methodology 15
- 2.3 Research Limitations 16

3.0 Survey Results 17
- 3.1 Profile of Participating Employers 17
- 3.2 Career Paths 18
- 3.3 Age Profiles of Deck Officers and Engineering Officers 22
- 3.4 Employment Profile – Labour Demand 33

4.0 "Difficult to Recruit" Occupations 43
- 4.1 "Difficult to Recruit" – Deck Officer Certificates 44
- 4.2 "Difficult to Recruit" – Engineering Officer Certificates 44
- 4.3 "Difficult to Recruit" – Specialist Positions 45
- 4.4 "Difficult to Recruit" – Maintenance Positions 45
- 4.5 "Difficult to Recruit" – Shore-Based Administrative Positions 45
- 4.6 "Difficult to Recruit" – Design Positions 46
- 4.7 Factors that Affect Retention 47

5.0 Labour Supply 48
- 5.1 Introduction 48

6.0 Factors Affecting Current and Projected Marine Personnel Demand and Supply in Eastern Canada 53

7.0 Salary Estimates for At-Sea and Shore-Based Occupations 54

8.0 Occupational Age Profiles - Transport Canada Data 59
- 8.1 Canadian Seafarers - STCW Certification 59
- 8.2 Age Profile of Deck Officers 60
- 8.3 Age Profile of Engineering Officers 65
- 8.4 Transport Canada - Deck Officer Certificate Holders 69
- 8.5 Transport Canada - Engineering Officer Certificate Holders 72
- 8.6 Resident Province of Nautical and Engineering Certificate Holders 74

9.0 Environmental Scan 75
- 9.1 International – Marine Transportation Industry 75
- 9.2 Canadian Marine Industry 76

10.0 Recommended Steps to Enhance Access to Marine Career Opportunities 77

Appendix A – Survey 78

Appendix B – Training Institutions Interview Guide 84

Appendix C – NAICS Descriptions 87

Appendix D – Deck Officer Career Path 88

Appendix E – Engineering Officer Career Path 89

Bibliography 90

Executive Summary

The Marine Careers Secretariat (MCS), initiated by the Marine Institute and funded under the Canada/Newfoundland Labour Market Development Agreement, was established in 2002, to promote career and training opportunities in the marine transportation and offshore petroleum industries, to profile the importance of these industries in the local economy, and to contribute to addressing their human resource needs. The MCS is comprised of Federal and Provincial government departments and agencies, post-secondary education and training institutions, and industry.

In 2003, MCS commissioned this study of the labour demand and supply of marine occupations in the marine transportation and offshore petroleum industries. The objectives of this study were to:

- Identify marine careers opportunities in the marine transportation and offshore petroleum industries, both nationally and internationally, for residents of Eastern Canada;
- Identify the major barriers to accessing these opportunities; and
- Recommend steps to enhance access to marine career opportunities.

Strategic Directions Inc., (Consultant), a management consulting firm located in St. John's, Newfoundland and Labrador, was engaged by MCS to conduct the study.

The primary research conducted for the study focused on two key stakeholder groups in Eastern Canada:

- Marine transportation and offshore petroleum industries; and
- Educational institutions offering marine training programs of 12 or more months duration.

For purposes of this study Eastern Canada was defined as the Great Lakes, the St. Lawrence Seaway and Atlantic Canada. This definition includes the provinces of Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia and Newfoundland.

The Marine Careers Secretariat provided a list of prospective participants in the study. Thirty-two companies and government stakeholders provided information to the study by completing the survey and employment matrix presented in Appendix A. These documents were supplied to the participants for review, and were completed at the preference of the participant either through an interview with the Consultant, or completed and submitted by the participant. The Consultant was available to address participants' questions. Where possible, the Consultant contacted participants to address specific questions arising from the completed documents.

The current and forecast employment numbers received from the companies and government stakeholders provide a view of labour demand for the participating employers. The number of graduates of various navigation and engineering programs provided by the colleges provides an indication of one source of new entrants to the labour supply. Other sources of new entrants, such as immigrants, were not examined by the study.

Nine training institutions participated in the study:

1. Georgian College;
2. Institut Maritime du Québec;
3. Nova Scotia Community College;
4. New Brunswick Community College;

5. Niagara College;
6. Holland College;
7. Canadian Coast Guard College;
8. Marine Institute; and
9. College of the North Atlantic.

All the training institutions participated in a telephone or personal interview with the Consultant to complete the interview guide presented in Appendix B. Canadian Coast Guard College provides training only for individuals recruited for employment with the Canadian Coast Guard. Since Coast Guard College graduates are not available for industry positions, the Canadian Coast Guard College results were not included in the forecast of graduates from marine officer programs. The College of the North Atlantic does not provide marine training, and the cross-over from trades and technicians programs to the marine environment is unknown. Graduates from College of the North Atlantic have not been included in the forecast of graduates.

International Opportunities for Deck and Engineering Officers

The BIMCO/ISF *2000 Manpower Update* report indicates there was a shortfall of 16,000 officers or 4% of the total workforce for the world fleet in 2000. The report forecasts the shortage of officers will increase to 46,000 by 2010 unless there is an increase in training or an improvement in the retention rate of seafarers. While there is a significant surplus supply of ratings, there are "doubts about the extent to which large numbers of these ratings are qualified for international service."[1]

Career opportunities for deck and engineering officers resident in Eastern Canada are available in Eastern Canada and internationally arising from anticipated replacement requirements for the aging population of senior marine officers and projected growth of the marine transportation and offshore petroleum sectors. The participating employers operate in Eastern Canada, and some operate internationally.

Section I – Survey Results

Deck Officers

Deck officers may choose to follow three at-sea career paths leading to the senior marine certificates *Master Mariner*, *Master Local Voyage* or *Master 350 tonne*. There is mobility/transferability among the career paths with completion of marine training courses and examinations specified by Transport Canada.

Eastern Canada

The results of the survey indicate there will be career opportunities for deck officers arising from replacement needs and growth in the industry:

- Participating employers forecast a total of 125 deck officers will leave at-sea positions during the period 2004 to 2008 and 112 during the period 2009 to 2013, for a total of 237 during the ten year period 2004 - 2013. The average age of retirement for deck officers over the last five-years for the participating employers was 65.

[1] *BIMCO/ISF 2000 Manpower Update, The Worldwide Demand for and Supply of Seafarers*, Institute for Employment Research, University of Warwick, 2000, (p.2).

- Participating employers forecast that growth in the total number of deck officers (excluding cadet positions) they employ will increase 26% (256) by 2008, and 13% (151) by 2013. This is a conservative estimate, as it does not account for attrition.

There is mobility within the deck officer labour force as participating employers forecast a total of 43 deck officers will leave an at-sea position with an employer for another at-sea position with another employer during the period 2004 to 2008, and 42 during the period 2009 to 2013.

There are career opportunities in the career paths leading to *Master Mariner*, and *Master 350 tonne* certificates. (No issues were identified with the *Master Local Voyage* career path.) Based on their recruitment experience, the participating employers identified the following deck officer certificates as "difficult to recruit":

- Master Mariner;
- Master, Intermediate Voyage;
- Mate, Intermediate Voyage; and
- Master, 350 tonne.

"Difficult to recruit" means it takes a longer time to recruit a qualified candidate, the recruitment effort is extended to other provinces, or countries, etc.

It should be noted that the *Mate, Intermediate Voyage* and *Master, Intermediate Voyage* certificates are prerequisite to the *Master Mariner* certificate. These certificates are required for vessels working internationally.

It should be noted that the *Mate, Intermediate Voyage* and *Master, 350 Tonne* are the next level certificates to the entry-level certificate *Watchkeeping Mate, Unrestricted* and *Watchkeeping Mate, Restricted*, respectively. In other words, some participating employers are having difficulty recruiting certificate holders who are only one Transport Canada marine certificate beyond the entry-level.

Other labour demand and supply studies relating to the marine industry in Ontario, particularly the Niagara region, and Quebec report increasing demand for deck and engineering officers. The study "*Making Waves – A Profile of Career Opportunities in Niagara's Marine Sector*" reported "Marine industry employers in Niagara and vicinity are facing acute shortages of qualified labour." Job growth is projected. [2] (The primary focus in the Niagara area is the Great Lakes companies, several of which also participated in the MCS survey.) The Sectoral Committee of the Quebec Marine Industry reported that "First and foremost, all the players within the maritime industry have expressed a real and pressing demand for navigating and engineering officers."[3]

Other studies completed by Niagara College, the Sectoral Committee of the Quebec Marine Industry, and BIMCO/ISF also recognize the long time frame required to address the shortage of senior marine certificates. Developing the necessary labour supply to meet the demand requires a specific long-term focus. The requirement for completion of training and sea service to advance to senior marine certificates is a minimum seven to eight-years.

Other provincial jurisdictions recognize the importance of taking action to address the demand for marine officers. "Given the age of officers and the amount of time it take(s) to complete a training

---

2 *Making Waves – A Profile of Career Opportunities in Niagara's Marine Sector*, Niagara College Canada, 2000 (p.v.).

3 Executive Summary of *Sectoral Profile – "Let's Not Miss the Boat"*, Sectoral Committee of the Quebec Marine Industry, 2002, (p.16).

program that combines work and study, it is important to develop an aggressive, well designed plan to address the shortage of navigating personnel."[4]

Barriers

The MCS survey results identified several barriers to taking advantage of the deck officer career opportunities identified:

- A high number of *Watchkeeping Mate, Unrestricted* certificate holders are more than 40 years of age. Since this is the entry-level certificate for deck officer career paths leading to *Master Mariner* and *Master 350 tonne* certificates, there is a concern that this "bottleneck" at the beginning of the career paths will impede sufficient entry-level opportunities for new recruits and therefore opportunities to advance to the next level certificate, *First Mate Intermediate.*
- Limited number of opportunities for deep-sea experience, a requirement for the *Master Mariner* certificate. This barrier has also been reported by other studies.[5]
- Only 50% of participating employers who employ marine certificate level permanent full-time and seasonal positions offer cadet positions. The reasons why other participating employers do not offer positions to cadets included:
    - In some unionized organizations, it is difficult for cadets to gain hands-on experience as they are not permitted to perform the tasks/functions of a unionized position; and
    - Crewing companies and vessels operating under contract require the clients' concurrence to hire cadet positions, so the availability of cadet positions is variable over time.

Engineering Officers

Overview

For the participating employers, the age profile of engineering officers indicates that engineering officers in Eastern Canada are significantly older than deck officers. The largest cohort of *First Class* through *Fourth Class Marine Engineer* certificate holders is 41 to 50 years of age.

An alternate career choice for *Third Class Marine Engineer* is the Chief Engineer position on some vessels. Therefore, there is some leakage from the career path leading to *First Class Marine Engineer* certificate. The impact of this career choice on the supply and demand for *Third Class Marine Engineer* certificates was not identified by this study, as the focus was on marine certificates, not positions.

The average age of retirement for engineering officers over the last five years (as reported by participating employers) was 63.

Opportunities

The results of the survey indicate there will be career opportunities for engineering officers arising from replacement need and growth in the industry.

---

4 Ibid., (p.16).

5 Stakeholder Forum and Working Session Report, May 29, 2003, Presentation and Discussion of the Study "*Labour Market Assessment of the Offshore Oil and Gas Industry Supply and Service Sector in Newfoundland and Labrador*", Petroleum Industry Human Resources Committee (PIHRC), (p. 12).

- Participating employers forecast 106 engineering officers will leave at-sea positions during the period 2004 to 2008 and 143 during the period 2009 to 2013 for a total of 249 during the 2004-2013 period.
- Twenty-three participating employers reported 933 engineering officer positions. These positions are forecast to increase by 19.7% to 1117 by 2008, and by 10.7% to 1237 by 2013.
- Participating employers forecast employment growth at all marine engineer certificate levels.

There is mobility within the engineering officer labour force as participating employers forecast a total of 44 engineering officers will leave an at-sea position with one employer for an at-sea position with another employer during the period 2004 to 2008, and 45 during the period 2009 to 2013.

There may be better career opportunities at all engineering officer certificate levels than for deck officer certificate holders. Engineering officer certificate holders are an older group, and the projected number of new entrants from marine engineering programs is lower than deck officers.

Based on their recruitment experience, the participating employers identified the following engineering officer certificates as "difficult to recruit":

- First Class Marine Engineer;
- Second Class Marine Engineer;
- Third Class Marine Engineer; and
- Fourth Class Marine Engineer.

In other words, all classes of marine engineering certificates were identified by some participating employers as "difficult to recruit". *First Class Marine Engineer* and *Second Class Marine Engineer* were most often reported as "difficult to recruit" and were often also identified as "difficult to retain".

Since *Fourth Class Marine Engineer* is an entry-level certificate, it is reasonable to conclude that there are career opportunities for marine engineers.

Barriers

Participating employers identified several factors which contribute to the difficulty experienced by companies in recruiting *First Class* and *Second Class Marine Engineer* certificate holders:

- Shortage of people with these qualifications, based on participating employers' recruitment experience. This was the most often cited reason;
- Opportunities available for shore-based employment in other industries;
- Competing with higher salaries offered by other industries such as the offshore petroleum industry;
- Difficulty attracting people to those positions which are seasonal. The majority of positions are full-time positions; and
- Less popular occupational choice than deck officer and fewer people are entering college marine engineering programs. In terms of physical work environment, the engine room may be viewed as a less desirable place to work.

From the analysis of the employment profiles provided by participating employers, it appears there is a bottleneck at *Fourth Class Marine Engineer*, the entry-level certificate. Many certificate holders appear to have chosen this as a career position. Other barriers identified are:

- Individual companies most often identified work rotation and leave as factors affecting recruitment. Specific issues identified were the lack of an adequate leave system on the Great Lakes and the different at-sea and onshore rotation used by the offshore petroleum industry. Generally, the requirement to be away from home is a disincentive, particularly when shore-based positions are available; and
- Supply and demand was also frequently cited by the participating employers identifying "difficult to recruit" deck or engineering certificates.

Onboard Personnel

For the participating employers in Eastern Canada, the top 4 provinces of residence of onboard personnel are Newfoundland and Labrador, Nova Scotia, Quebec, and Ontario, in that order. Newfoundlanders and Labradorians are finding employment across the participating employers. Many Newfoundlanders and Labradorians work with the Great Lakes companies, which are well represented in the survey sample.

Not surprisingly, of the participating employers in the survey, those employers in the marine transportation industry account for the largest number of onboard personnel, followed by those companies working in the marine transportation and the offshore petroleum industry, and then the offshore oil and gas industry.

Other Marine Positions

The survey also focused on at-sea and shore-based positions that did not require Transport Canada certificates, including groups such as catering, unlicensed marine personnel, maintenance, and administrative personnel. The specific positions are listed in the employment matrix presented in Appendix A.

Positions identified as "difficult to recruit" to varying degrees by participating employers include:

- Marine Crane Operator, due to applicants' lack of offshore experience. This finding is consistent with the findings of other studies[6];
- Marine Electrical Technician;
- Marine Electronics Technician;
- Instrumentation Technician;
- Marine Superintendent/Operations Manager; and
- Safety Manager.

In the shipbuilding repair and fabrication industry (including fabrication for offshore oil and gas projects) design positions such as naval architect, naval architectural design technologist, marine engineering design technologist, engineering design technologist and draft person/CADD operator were all identified by at least one employer as "difficult to recruit".

For each of these positions, the number of Employment Insurance claimants starting a claim during the same period as the data collection and for the same geographic area was low

[6] Labour Market Assessment of the Offshore Oil and Gas Industry Supply and Service Sector in Newfoundland and Labrador, Petroleum Industry Human Resources Committee, 2003.

indicating there is not a large labour supply available for employment at least from the Employment Insurance claimants.

Retention

In the marine transportation sector, for the majority of certificates and positions identified as "difficult to recruit", fewer participating employers identified these certificates and positions as "difficult to retain". The most frequently cited factor affecting retention was work rotation and leave, specifically the time away from home. Other factors affecting retention are opportunities for other positions, competitive salary, continuous employment rather than seasonal employment, opportunity to progress in marine careers, and challenging positions.

In the shipbuilding and repair industry (including fabrication work for oil and gas projects) several sector-specific factors affect retention including the cyclical nature of the work in Canada, and higher salaries and more job opportunities in other countries such as the US for experienced production engineers, draftspersons and architects.

Employment of Females

Participating employers report a relatively small number of females (146) in at-sea positions.[7] The majority of females are employed in traditional positions such as cooks, stewards, assistant stewards and caterers. Some females are employed in deck and engine officer positions and unlicensed marine positions.

The small number of females employed in at-sea occupations, and the smaller subset of the group of females who work in non-traditional occupations, is also represented in Census 2001 employment information for the water transportation industry.[8] The Census 2001 data reports 6% (305) of deck officers in Canada are female, and of those 30% (90) work full-year, full time. Similarly, 8.7% (410) deck crew in Canada are female and of those 26% (105) work full-year, full time. The number of females working as engineering officers or engine room crew in Canada was not available under the Statistics Canada reporting guideline that if a population is less than 250 in any category, it is not reported.

While a number of participating employers indicated there are no barriers to employment of females in at-sea occupations, the participation rate of females in at-sea occupations is low. Several participating employers noted they receive few applications from females for at-sea positions, and others note few females have the required training and experience for the positions. In some instances, employers indicated that the lack of separate accommodations on older vessels is a barrier to females.

Other Canadian studies have reported a small number of women employed in the industry:

> "Employers from our sample suggested looking to the industry's employment equities as a potential source for increasing recruits. Women were identified as one of the untapped potential labour force sources. With women representing only 3% of our sample's respondents, industry employers may be accurate about their 'untapped potential'; albeit,

---

7 One participant reported more than 200 positions for females in catering positions, assistant stewards, which were not included in the total employment for 2003 and therefore are not included in this section.

8 Statistics Canada's report *Number and Average Employment Income (2) in Constant 2000 Dollars, Sex (3), Work Activity (3) and Occupation – 1991 Standard Occupational Classification (Historical) (707A) for Population 15 Years and Over With Employment Income for Canada, Provinces, Territories and Census Metropolitan Areas, 1995 and 2000 – 20% Sample Data.* This Report uses data from 2001 Census.

perhaps overly optimistic of their willingness to enter the industry without significant changes in the milieu of life on-board."[9]

"Internationally, women represent less than 2% of the world's 1.25 million seafarers, with the majority working as cooks, porters, or waitresses in the cruise segment of the industry. European Union fleets fair a little better, with women representing 4-5% of their total workforce. The socio-cultural factors impeding the integration of women onboard have deep roots in most countries. And although we may wish to think Canada is different, our findings (through both employer interviews and respondent questionnaires) suggest that we too need to improve not only our (hiring) numbers, but also our support for the integration of female mariners.

The International Maritime Organization (IMO) was the first organization to develop a formal strategy for the integration of women into the marine sector. The *IMO Women In Development Programme* was initiated in 1989, and offers the best resource for learning how to enhance marine training and jobs for women. Their experience suggests the need for multifaceted interventions, including, but not limited to, the following areas:

- Gender-Awareness Training across the sector;
- Gender-specific Fellowships;
- Shorter voyages and/or longer home leave, and
- Improved on-board accommodation and facilities.

The IMO also notes that the strategies above not only attract more women to the marine professions but also benefits all seafarers, regardless of gender."[10]

Labour Supply – Survey Findings

Two groups which impact labour supply were considered in the survey, namely Employment Insurance claimants, and college graduates. For the marine certificates and positions identified by participating employers in the survey as "difficult to recruit", small numbers of Employment Insurance claimants who started claims during the same work period as the collection period for the study data were identified. At the time of the study, the available labour pool from employment insurance claimants was not substantial for occupations that were identified as "difficult to recruit" by participating employers.

It is interesting to note that there are 50% more deck officers than engineering officers among Employment Insurance Claimants. This is consistent with data indicating a higher number of graduates from deck officer programs than from engineering officer programs.

Also, the number of Deck Crew (NOC 7433) is significantly higher than Engine Room Crew (NOC 7434), 891 and 217, respectively. These unlicensed marine personnel are not indicated by employers as "difficult to recruit"; however, it is consistent with the findings of other studies that engineering is perceived as a less attractive occupational choice than deck or navigation officer. Fewer students enrol in marine engineering programs than in navigation programs, the population of marine engineers is older than their deck officer counterparts and a greater proportion of the employers participating in the survey reported engineering officers as "difficult to recruit" than deck officers.

---

[9] Making Waves – A Profile of Career Opportunities in Niagara's Marine Sector, Niagara College Canada, 2000 (p.32).

[10] Ibid., (pp. 32-33).

While the need, and therefore the opportunity, for engineering officers is greater, the number of graduates forecast from engineering officer programs is lower than for deck officer programs. Modest growth in the number of engineering officer graduates is forecast to the year 2013.

The most frequently identified factors affecting current and future demand and supply of marine personnel in Eastern Canada were concurrent major projects and growth of the offshore oil and gas industry. Other factors were identified, such as volume of bulk transport, national transportation policy regarding investment and crewing requirements for the marine transport industry, lower wages for foreign seafarers, decrease in size of the Canadian fleet, lack of a national strategy to encourage young people to consider marine careers balanced with the fact the number of vessels in the Canadian fleet is declining, and others.

Salaries for at-sea and shore-based marine related occupations reported by participating employers compare well to the average employment income in Canada as reported by the 2000 Census.

The findings of the survey and other studies concur that there is a need "to improve perceptions of the industry as a career."[11]

Section II – Occupational Age Profiles Transport Canada Data

The IMO Convention on Standards of Training, Certification and Watchkeeping 1978 (STCW), which regulates international training and certification standards in the marine transportation industry, was amended in 1995 with "the objective of upgrading the overall standard of competence of seafarers employed in the world fleet."[12] In Canada, the implementation of STCW required seafarers to apply to Transport Canada for the STCW certificate.

Transport Canada's database of mariners with STCW certificates is believed to provide a reasonably accurate view of valid marine certificate holders. Transport Canada officials reviewed each individual's record to determine highest certificate held and age category, based on a database query on December 30, 2003.

The numbers do not include holders of certificates who did not possess a valid STCW 95 endorsement. Many seafarers working in Canada possess certificates that are accompanied by Continued Proficiency (CP) Endorsements. Such certificates are valid only for use within Canada and on certain voyages between Canada and the US. The holders of certificates with CP Endorsements and not STCW 95 endorsements were not included.

Deck Officers

Of the 2013 deck officer certificate holders reported in Eastern Canada by Transport Canada, 18% (367) are under 30 years of age, 27% (536) are 30 to 40 years of age, 35% (705) are 41 to 50 years of age, 10% (208) are 51 to 55 years of age and 10% (197) are more than 55 years of age.

Based on a review of the age profile for each marine certificate on the three career paths leading to the senior certificates *Master Mariner*, *Master Local Voyage* and *Master 350 tonne*, the following observations arise:

---

11 *BIMCO/ISF 2000 Manpower Update, The Worldwide Demand for and Supply of Seafarers*, Main Report, Institute for Employment Research, University of Warwick, 2000 (p.3) and Executive Summary of *Sectoral Profile – "Let's Not Miss the Boat"*, Sectoral Committee of the Quebec Marine Industry, 2002.

12 *BIMCO/ISF 2000 Manpower Update, The Worldwide Demand for and Supply of Seafarers*, Main Report, Institute for Employment Research, University of Warwick, 2000 (p. 4).

- In the career path to *Master Mariner*, the findings of note are:
  - Of 648 *Master Mariner* certificate holders, the largest group, 45% (294), are 41 to 50 years of age and approximately 34% of the *Master Mariner* certificate holders are 51 or more years of age, comprising of 15% (96) in the 51 to 55 years of age category and 19% (125) in the 55 years of age and older category.
  - A high percentage (26%) of *Mate Intermediate Voyage* are 41 to 50 years of age, and 35% are 41 to more than 55 years of age. Given that this is only the second certificate in the career path to *Master Mariner*, this is a high proportion.
  - Other certificates in this career path have expected age distribution profiles. For example, the majority of *Watchkeeping Mate, Unrestricted* certificate holders are under 31 years of age.

- In the career path to *Master Local Voyage*, of approximately 36% (46) of the 126 *Master Local Voyage* certificate holders are 51 or more years of age.

- In the career path to *Master 350 tonne*, no issues were identified.

A substantial number of *Master Mariner* certificate holders will reach 65 years of age over the next five to ten years. This will strain the prerequisite *Master, Intermediate Voyage* certificate cohort as the current population holding this certificate is significant smaller, only 38% of the number of *Master Mariner* certificate holders. If individuals in this group do not wish to pursue certification as *Master Mariner*, there is potential for a bottleneck in filling the positions requiring *Master Mariner* certificates. This analysis deals with replacement, assuming there is no reduction in the size of the industry/fleet, and does not address additional personnel required to address any growth in demand. These are conservative assumptions.

One of the issues in gaining a *Master Mariner* certificate is limited access to deep-water experience. "In the marine sector, individuals must acquire sea time experience to progress through the levels of marine competency certification. Two issues were identified with regard to acquiring sea time experience. Senior level positions require deep-sea experience. For example, to progress from a Master Intermediate Voyage certificate to a Master Mariner certificate requires 12 months deep-sea experience, which can not be acquired locally. (Master Mariner qualification is an international standard.) Also, at this time, experience on floating production, storage and offloading (FPSO) vessels is not recognized as accredited sea time."[13]

It should be noted that the *Watchkeeping Mate, Unrestricted* certificate is the fundamental certificate for a career leading to a *Master Local Voyage* or a *Master Mariner* certificate.

As expected, in the entry-level marine certificates for deck officer, few are expected to retire.

Replacement of Deck Officers

Replacement for retirements (assuming retirement at 65 years of age) will be 25% for *Master Mariner* certificate holders in Canada during the next 10 years. *Master Mariner* certificate holders in Eastern Canada account for 19% of those expected to retire during that period.

[13] Stakeholder Forum and Working Session Report, May 29, 2003, Presentation and Discussion of the Study "*Labour Market Assessment of the Offshore Oil and Gas Industry Supply and Service Sector in Newfoundland and Labrador*", Petroleum Industry Human Resources Committee (PIHRC), (p. 12).

A summary of the main points regarding replacement of deck officers includes:

- Twelve percent (332) of 2815 deck officers in Canada (as reported by Transport Canada) will reach age 65 by 2013. Of the 2013 total deck officers in Eastern Canada, as reported by Transport Canada, 10% will reach age 65 by 2013;
- A high percentage of replacement is expected at the senior deck officer certificate levels for each of the career paths, namely *Master Mariner*, *Master Local Voyage*, *Master Local Voyage 350 tonne*; and
- A greater percentage of total certificate holders reaching age 65 will occur in the period 2009 to 2013.

Engineering Officers

Of the 2605 engineering officer certificate holders reported in Eastern Canada by Transport Canada, 9% (246) are under 30 years of age, 19% (500) are 30 to 40 years of age, 37% (968) are 41 to 50 years of age, 13% (348) are 51 to 55 years of age, and 21% (543) are more than 55 years of age. The largest cohort in the engineering officers is 41 to 50 years of age.

Transport Canada data indicates, as illustrated in Figure 1:

- Engineering officer certificate holders are an older group than the deck officers;
- There is a smaller percentage of young engineering officers (under 31 years of age and 31 to 40 years of age); and
- The percentage of engineering officers more than 55 years of age is 21%, compared to 10% of deck officers.

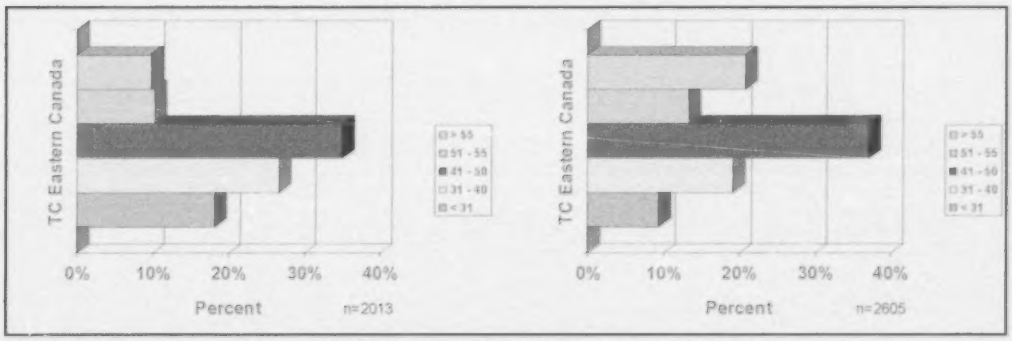


Figure 1 – Comparison of Age Profiles for Deck and Engineering Officers

A high percentage of *Fourth Class Marine Engineer* certificate holders which is the entry-level certificate for the marine engineering career path, are more than 50 years of age. For *Third Class Marine Engineer* few certificate holders are under 31 years of age, and 40% are more than 50 years of age. Given this is the second certificate on the career path to *First Class Marine Engineer* this represents a bottleneck in the career path.

The percentage of *Second Class Marine Engineer* and *First Class* certificate holders more than 50 years of age is high, 31% and 39% respectively. This indicates there will be opportunities lower in the career path as mid-level certificate holders move up as a result of the attrition from *Second Class* and *First Class Marine Engineer*.

Replacement of Engineering Officers

The replacement percentage of total marine engineer certificate holders in the next 10 years is high in all classes of certificates. Also the population of *Fourth Class Marine Engineer* is small.

- Of the 3,741 total marine engineers in Canada holding Transport Canada certificates (with STCW), 22% (814) will reach age 65 within the next 10 years. Of the total marine engineers in Eastern Canada, a subset of the marine engineers holding Transport Canada certificates, 21% (543) will reach age 65 within the next 10 years;
- As indicated in Table 21, there is a high percentage of replacement anticipated in the next 10 years in each of the classes of engineering certificates. Thus the combined upward progression through the career path will create opportunities at all certificate class levels; and
- A greater percentage of total certificate holders reaching age 65 will occur in the period 2009 to 2013.

Province of Residence for Nautical and Engineering Certificate Holders

Transport Canada data indicates that the top five provinces of residence for nautical and engineering certificate holders are British Columbia, Newfoundland and Labrador, Quebec, Ontario and Nova Scotia, in that order.

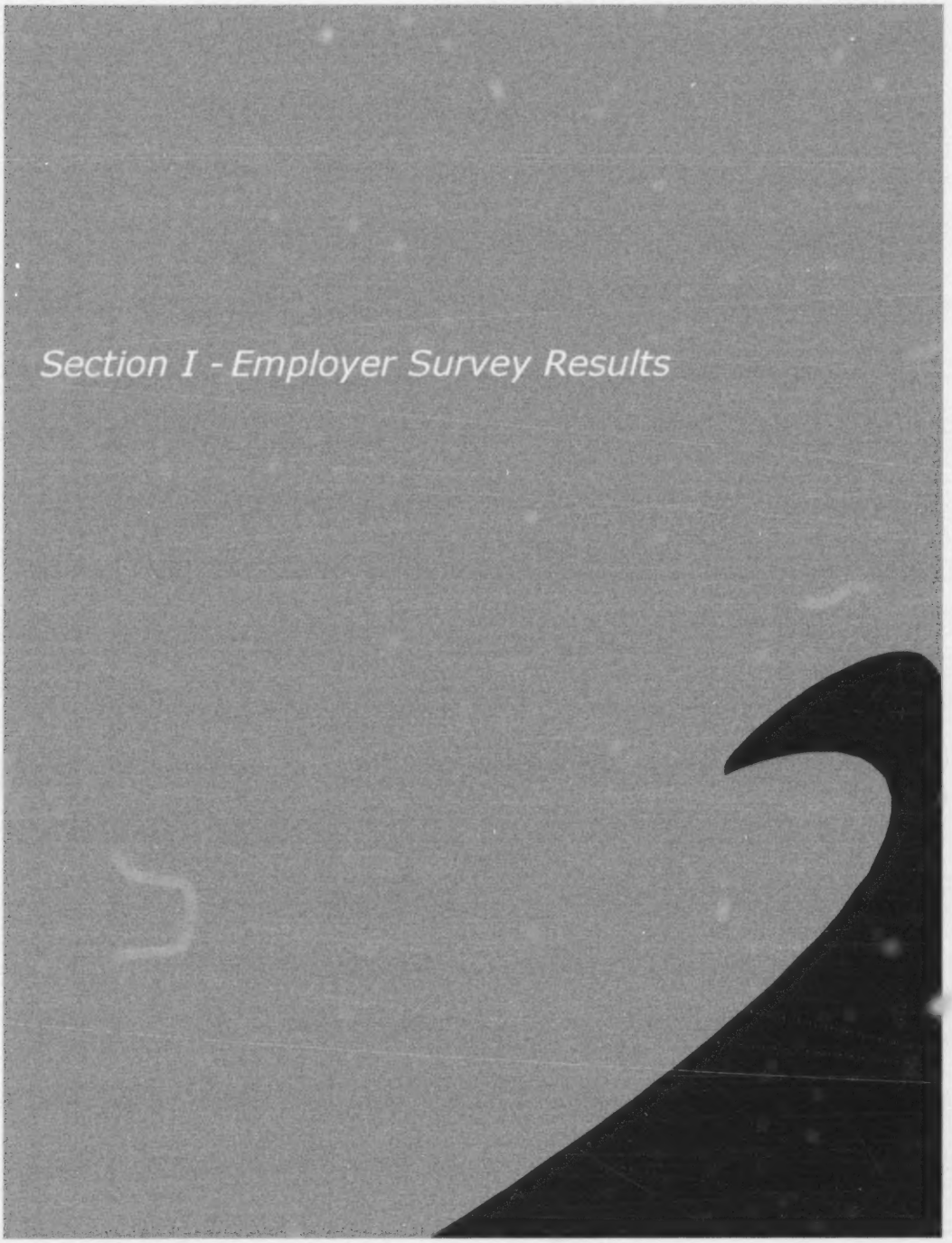
Recommended Steps to Enhance Access to Marine Career Opportunities

Access to marine career opportunities must be enhanced to meet the future marine transportation and offshore oil and gas industries needs in Eastern Canada. A number of steps are recommended to enhance access to marine career opportunities:

i) Initiatives to encourage existing personnel to upgrade skills, and promotion of training within the industry;
ii) Promotion of marine careers to increase awareness of career choices for youth, women, aboriginals and others;
iii) Identification of initiatives to encourage industry and, where applicable, unions to increase participation in cadet programs, thereby creating more industry training opportunities for cadets and providing flexibility to increase intake in training programs that incorporate industry work placements;
iv) Increased focus on marine engineering careers;
v) Development of a strategic human resources plan for seafarers in Eastern Canada, in collaboration with Transport Canada and other sectoral committees, including those in Quebec and the Niagara region of Ontario. A number of recent studies indicate there is a need to increase the number of deck and engineering officers, particularly engineering officers. A strategic human resources plan for Eastern Canada should define the demand for deck and engineering officers (in broad terms), identify the issues which impact the labour supply and demand, and identify how these issues will be resolved (i.e, what action will be taken);
vi) Working with industry to find plausible solutions to gaining access to deep-sea experience;
vii) Providing professional development opportunities specific to the marine industry for human resource managers;
viii) Extending the analysis of Transport Canada marine certificate holders to include the rest of Canada;
ix) Developing a program, guided by the experience of the *IMO Women In Development Programme*, that focuses on areas such as gender awareness training, gender-specific fellowships, leave systems, and on-board accommodation

and facilities. It may be necessary to conduct a study to identify and examine in detail why females are underrepresented in marine occupations, and what actions are necessary to increase their participation; and

x) Investigation of "best practices" in other marine jurisdictions.


Section I - Employer Survey Results

Section I – Employer Survey Results

1.0 Introduction

The Marine Careers Secretariat (MCS), initiated by the Marine Institute and funded under the Canada/Newfoundland Labour Market Development Agreement, was established in 2002, to promote career and training opportunities in the marine transportation and offshore petroleum industries, to profile the importance of these industries in the local economy, and to contribute to addressing their human resource needs. The MCS is comprised of Federal and provincial government departments and agencies, post-secondary education and training institutions, and industry.

In 2003, MCS commissioned this study of the labour demand and supply of marine occupations in the marine transportation and offshore petroleum industries. The objectives of this study were to:

- Identify marine careers opportunities in the marine transportation and offshore petroleum industries, both nationally and internationally, for residents of Eastern Canada;
- Identify the major barriers to accessing these opportunities; and
- Recommend steps to enhance access to marine career opportunities.

Strategic Directions Inc., (Consultant), a management consulting firm located in St. John's, Newfoundland and Labrador, was engaged by MCS to conduct the study.

2.0 Study Scope, Methodology and Limitations

2.1 Study Scope

The primary research conducted for the study focused on two key stakeholder groups in Eastern Canada:

- Marine transportation and offshore petroleum industries; and
- Educational institutions offering marine training programs of 12 or more months duration.

For purposes of this study, Eastern Canada was defined as the Great Lakes, the St. Lawrence Seaway and Atlantic Canada. This definition includes the provinces of Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, and Newfoundland and Labrador.

2.2 Study Methodology

The Marine Careers Secretariat provided a list of prospective participants in the study. Thirty-two companies and government stakeholders provided information to the study by completing the survey and employment matrix presented in Appendix A. These documents were supplied to the participants for review, and were completed at the preference of the participant either through an interview with the Consultant, or completed and submitted by the participant. The Consultant was available to address participants' questions. Where possible, the Consultant contacted participants to address specific questions arising from the completed documents.

The current and forecast employment numbers received from the companies and government stakeholders, provide a view of labour demand for the participating employers. The number of

students enrolling in various navigation and engineering programs and the number of graduates of these programs, provided by the colleges, provide an indication of one source of new entrants to the labour supply. Other sources of new entrants such as immigrants were not examined by the study.

Nine training institutions participated in the study:

1. Georgian College;
2. Institut Maritime du Québec;
3. Nova Scotia Community College;
4. New Brunswick Community College;
5. Niagara College;
6. Holland College;
7. Canadian Coast Guard College;
8. Marine Institute; and
9. College of the North Atlantic.

All the training institutions participated in a telephone or personal interview with the Consultant to complete the interview guide presented in Appendix B. Canadian Coast Guard College provides training only for individuals recruited for employment with the Canadian Coast Guard. Since Coast Guard College graduates are not available for industry positions, the Canadian Coast Guard College results were not included in the forecast of graduates from marine officer programs. College of the North Atlantic does not provide marine training, and the cross-over from trades and technicians programs to the marine environment is unknown. Graduates from College of the North Atlantic have not been included in the forecast of graduates.

2.3 Research Limitations

Several limitations of the research have been noted for consideration:

- While all participating employers provided information on the number of persons employed for the marine certificates and occupations identified in the employment matrix, a smaller number provided the age profile for the holders of marine certificates. As a result, the number of marine certificate holders employed and the total number of the age profile for the marine certificate holders cannot be fully reconciled.
- The age profiles included provide a "point in time" view of the marine certificate holders. The number of marine certificate holders participating in self-paced study programs required for advancement to the next level of certification is not known. The study reports the participating colleges' estimates of the number of Transport Canada courses being taken and forecast to be taken for the period 2001 to 2013. It is important to note that the number of courses do not equate to the number of individuals since individuals may enrol in more than one course at a time, and may repeat a course.
- The results of the survey are representative of the participating employers, but not necessarily representative of all employers in the industries. That being said, the major employers in Eastern Canada are represented in the survey sample.
- Information on seasonal employment was requested in the survey, but the responses were not sufficiently complete to identify it as a separate level of employment. The largest group identifying seasonal employment were the employers on the Great Lakes, where the employment period is generally nine months per year.

3.0 Survey Results

The employers participating in the survey reported activity for 2003. The data for 2003 was collected during the period June 2003 to March 2004.

3.1 Profile of Participating Employers

Participants in the survey included 31 companies and one provincial ferry service. As part of the survey, participating employers were asked to complete the Marine Transportation and Offshore Petroleum Industries Employment Matrix (Employment Matrix), presented in Appendix A. The participants identified 5,341 employees in the marine and marine related occupations identified in the Employment Matrix. Table 1 presents the total number of employees by province, based on the physical location of the participating organization, and the number of employers participating in each province.

Location of Company (Province)	Number of Employers Surveyed	Number of Marine and Marine Related Employees
Newfoundland and Labrador	16	1,468
Nova Scotia	3	621
New Brunswick	3	436
Prince Edward Island	2	0
Quebec	3	997
Ontario	4	1,524
Total	**31**	**5,341**

Table 1 – Total Number of Marine and Marine Related Occupations Employed by Participating Employers by Location of Company (Province)

The participating employers operate or crew 117 vessels in the marine transportation sector and 63 in the offshore petroleum industry. Table 2 presents the number of vessels reported by industry and industry sector.

It should be noted that the majority of companies operate more than one vessel.

Marine Transportation Industry	Number of Vessels in Category
Freight and/or Passenger Water Transport	81
Ferry (Federal & Provincial)	16
Marine Towing	16
Crew Recruiting	4
Total Vessels Reported Marine Transportation Industry	**117**
Offshore Petroleum Industry (All phases in Eastern Canada)	**Number of Vessels in Category**
Project Owner/Operator	3
Supply and Standby Vessels	18
Seismic and Chase Vessels	8
Petroleum Product Carriers/Tankers	15
Tugs	4
Crew Recruiting (may include some vessels reported above)	15
Total Vessels Reported Offshore Petroleum Industry	**63**

Table 2 – Number of Vessels Reported by Industry and Industry Sector

Twenty-seven participating employers reported the geographic scope of their operations. The majority of participating employers operate in Eastern Canada, and some also operate to a much lesser extend nationally and internationally.

Several of the major employers from the Great Lakes area participated in the survey.

3.2 Career Paths

For the purposes of this study, participating employers were asked to report the number of deck and engineering officers employed by marine certificate held. In Canada, marine certificates are regulated and issued by Transport Canada. Transport Canada regulations establish the qualifications required for each marine certificate, including sea experience required and completion of Transport Canada examinations. The career paths presented in Figures 2 and 3, were developed on the basis of the required progression through various levels of marine certification by deck and engineering officers.

As depicted in Figure 2, a deck officer has a choice of several career paths, *Master Mariner*, *Master Local Voyage* or *Master 350 tonne*. The career paths differ depending on the size and type of vessel and its voyage.

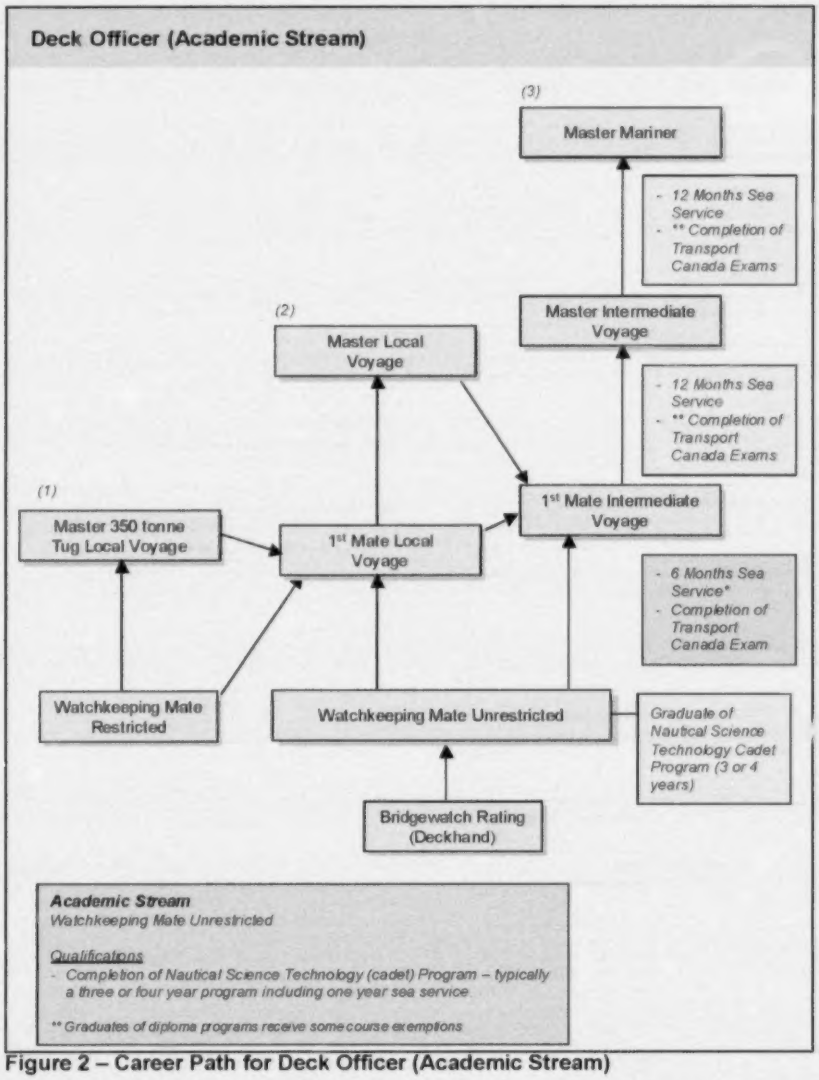

Deck Officer (Academic Stream)
(3)
Master Mariner
- 12 Months Sea Service
- ** Completion of Transport Canada Exams
Master Intermediate Voyage
(2)
Master Local Voyage
- 12 Months Sea Service
- ** Completion of Transport Canada Exams
(1)
Master 350 tonne Tug Local Voyage
1st Mate Local Voyage
1st Mate Intermediate Voyage
- 6 Months Sea Service*
- Completion of Transport Canada Exam
Watchkeeping Mate Restricted
Watchkeeping Mate Unrestricted
Graduate of Nautical Science Technology Cadet Program (3 or 4 years)
Bridgewatch Rating (Deckhand)
Academic Stream
Watchkeeping Mate Unrestricted
Qualifications
- Completion of Nautical Science Technology (cadet) Program – typically a three or four year program including one year sea service.
** Graduates of diploma programs receive some course exemptions

Figure 2 – Career Path for Deck Officer (Academic Stream)

The entry-level certificate required for the *Master Mariner* and the *Master Local Voyage* career paths is *Watchkeeping Mate, Unrestricted*. Entry at the *Watchkeeping Mate, Unrestricted* level may be achieved either by completing a three or four year Nautical Science Technology Program which includes 12 months sea service, or by acquiring 42 months sea service working as a *Bridgewatch Rating (Deckhand)*. In addition to the education and/or sea service, successful completion of the Transport Canada examination for the *Watchkeeping Mate, Unrestricted* certificate is required.

Completion of a Nautical Science Technology Program shortens the sea service time required to progress to the next level certificate, *First Mate Intermediate Voyage* or *First Mate Local Voyage*, from 12 months to 6 months. Those individuals obtaining the *Watchkeeping Mate, Unrestricted* certificate through experience are required to complete 12 months sea service before being eligible to progress to the *First Mate Intermediate Voyage* or *First Mate Local Voyage*. Appendix

C presents a career path depicting the academic and sea experience, and sea experience only options for advancement to Master level marine certification.

Completion of Transport Canada examinations is required before progression to the next level certificate in all of the deck officer career paths depicted in Figure 2.

Progression from the *Watchkeeping Mate, Unrestricted*, the entry-level certificate, through to *Master Mariner* takes a number of years. Completion of a Nautical Science Technology Program and requisite minimum sea time for each level certificate of the *Master Mariner* career path, requires a minimum commitment of seven to eight years to progress to a *Master Mariner* certificate. (Accumulation of sea service is impacted by work/leave schedules. For example, it would can take 12 months to acquire six months sea service on a one-on one-off rotation, or 12 months to acquire eight months sea time on a two months on, one month off rotation.)

Certificate examination courses are self-paced, so the pace of progress through the career paths is largely an individual's choice. Some certificate holders choose to take significantly more time than the minimum required to complete the next level certificate. The survey results show that large numbers of marine certificate holders choose not to progress to the highest level of certificate in a career path, making positions requiring entry or intermediate level certificates their career.

An engineering officer has a choice of two career paths, as depicted in Figure 3. From the entry-level, *Engine Watch Rating (Engine Room Assistant)* through the *Fourth Class Marine Engineer* to *First Class Marine Engineer* certificates may take a minimum of eight years. An alternative career path for *Third Class Marine Engineer* certificate holders is the Chief Engineer position, which is the senior marine engineering position on some vessels.

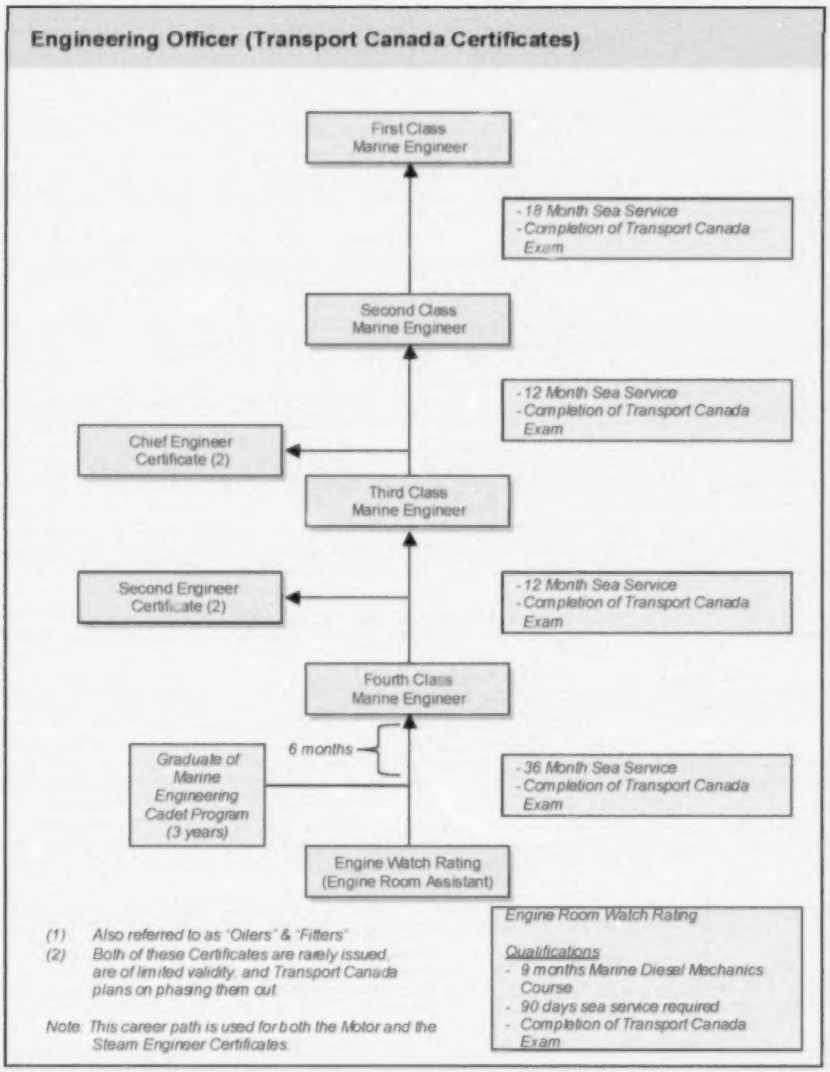

Engineering Officer (Transport Canada Certificates)
First Class Marine Engineer
- 18 Month Sea Service
- Completion of Transport Canada Exam
Second Class Marine Engineer
- 12 Month Sea Service
- Completion of Transport Canada Exam
Chief Engineer Certificate (2)
Third Class Marine Engineer
Second Engineer Certificate (2)
- 12 Month Sea Service
- Completion of Transport Canada Exam
Fourth Class Marine Engineer
6 months
Graduate of Marine Engineering Cadet Program (3 years)
- 36 Month Sea Service
- Completion of Transport Canada Exam
Engine Watch Rating (Engine Room Assistant)
Engine Room Watch Rating
Qualifications
- 9 months Marine Diesel Mechanics Course
- 90 days sea service required
- Completion of Transport Canada Exam
(1) Also referred to as "Oilers" & "Fitters"
(2) Both of these Certificates are rarely issued, are of limited validity, and Transport Canada plans on phasing them out
Note: This career path is used for both the Motor and the Steam Engineer Certificates.

Figure 3 – Career Path for Engineering Officers

Since progression to the next highest level of marine certificate for both deck and engineering officers is sequential, and the time period required to move from the entry-level position to the highest certificate is a minimum of seven or eight years, it is critical that there is sufficient opportunity for career progression to meet any anticipated shortages.

The career paths for deck and engineering officers (i.e., the sequencing of marine certificates required) provides a structure to analyse the survey data regarding the age profiles of the marine certificate holders.

3.3 Age Profiles of Deck Officers and Engineering Officers

Of the 32 participating employers, 22 have onboard personnel and 18 of these provided the age profile of deck and engineering officers. A total of 651 deck officers and 691 engineering officer certificate holders were reported.

3.3.1 Deck Officers

Of the 651 deck officers reported by participating employers, 12% (76) were under 31 years of age, 31% (205) were 31 to 40 years of age, 30% (197) were 41 to 50 years of age, 18% (116) were 51 to 55 years of age, and 9% (59) were over 55 years of age. This age profile is depicted in Figure 4.

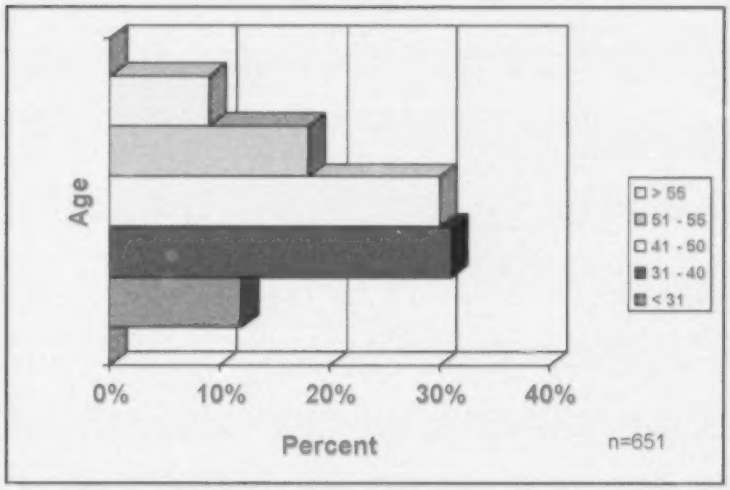


Figure 4 – Age Profile of Deck Officers

Of the 651 deck officers reported, 61% (402) were in the age categories 31 to 40 and 41 to 50 years of age. The age distribution indicates 27% (175) of the deck officers were more than 50 years of age, and of those 9% (59) were over 55 years of age. A conservative estimate of potential retirements from the deck officer group is that those over 55 years of age will reach age 65 within the next 10 years.

Watchkeeping Mate, Unrestricted

Watchkkeeping Mate, Unrestricted is the entry-level certificate for each of the career paths to *Master Mariner* and *Master Local Voyage* certificates. Figure 5 illustrates the age profile of *Watchkeeping Mate, Unrestricted* certificate holders reported by participating employers.

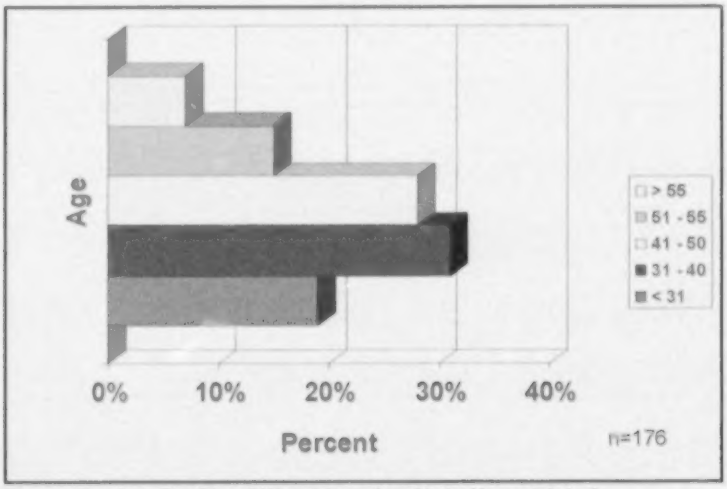


Figure 5 – Age Profile of Watchkeeping Mate Unrestricted

Of the 176 *Watchkeeping Mate Unrestricted* certificate holders reported, more than 50% (89), were more than 40 years of age. This suggests that many *Watchkeeping Mate Unrestricted* certificate holders are not choosing to progress to the next level of marine certificate, *First Mate Intermediate Voyage*. This can create a bottleneck at the beginning of the career path for deck officers.

First Mate Intermediate Voyage

Figure 6 illustrates the age profile of the 110 *First Mate Intermediate Voyage* certificate holders reported by participating employers. Forty percent (44) of *First Mate, Intermediate Voyage* certificate holders were more than 40 years of age and 16% (17) were more than 50 years of age.

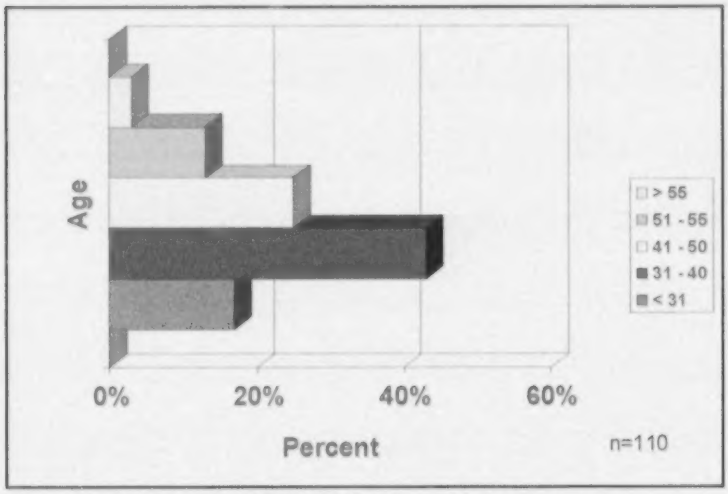


Figure 6 – Age Profile of First Mate Intermediate Voyage

Master Intermediate Voyage

Of the 109 *Master Intermediate Voyage* certificate holders reported by participating employers, only 7% (8) were under 31 years of age. This is an expected result because a minimum of six years is required in either sea time service or a combination of education such as a nautical cadet program and sea time to qualify for a *Master Intermediate Voyage* certificate. For example, completion of a nautical science technology (cadet) program which is typically three or four years in duration results in a *Watchkeeping Mate Unrestricted* certificate. At least another eight months is required to accumulate six months of sea service to complete a *First Mate Intermediate Voyage* certificate, and at least 18 additional months are required to acquire 12 months sea service at the *First Mate Intermediate Voyage* level to be eligible for a *Master Intermediate Voyage* certificate. This example assumes there is consistent employment immediately after graduation and the next position for the certificate is immediately available to the individual.

As presented in Figure 7, 34% (37) of *Master Intermediate Voyage* certificate holders were 31 to 40 years of age, and 30% (33) were 41 to 50 years of age.

Twenty-eight percent (31) of *Master Intermediate Voyage* certificate holders were more than 50 years of age.

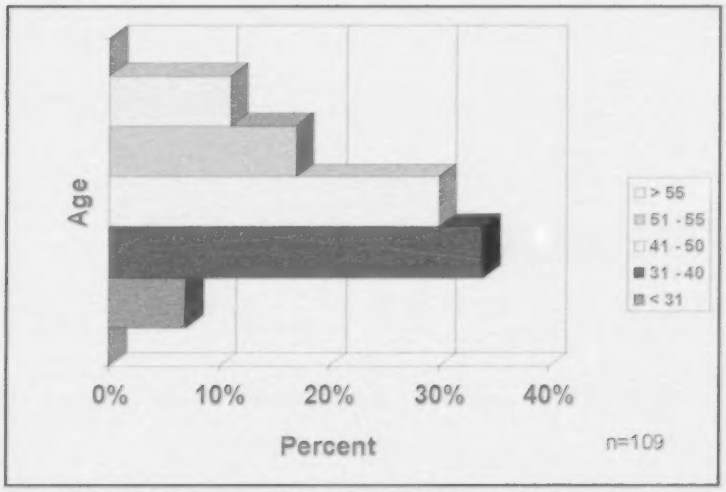


Figure 7 – Age Profile of Master Intermediate Voyage

Master Mariner

One hundred *Master Mariner* certificate holders were reported by participating employers. Of these, 2% (2) *Master Mariner* certificate holders were under 31 years of age, 29% (29) were 31 to 40 years of age, 37% (37) were 41 to 50 years of age and 32% (32) were more than 50 years of age. Figure 8 illustrates the age profile of *Master Mariner* certificate holders.

Other studies have noted that the limited number of opportunities for deep-sea experience, a requirement for the *Master Mariner* certificate, is an issue.[14]

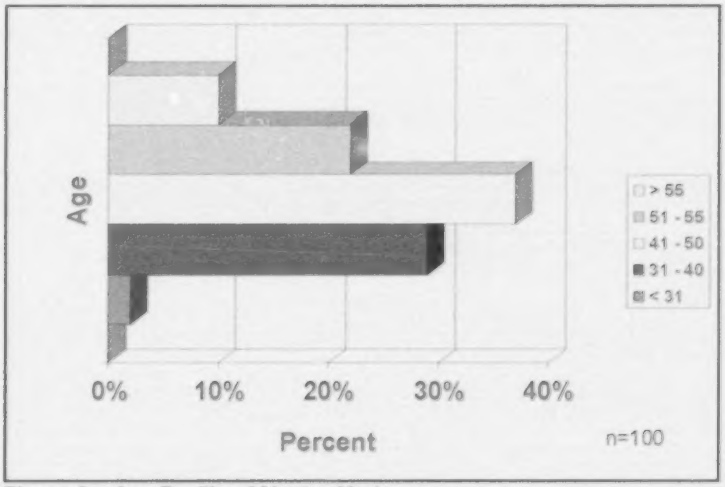


Figure 8 – Age Profile of Master Mariner

Master Local Voyage

The survey results do not identify any bottleneck or replacement issues with the career path leading to *Master Local Voyage*. Figures 9, 10 and 11 present the age profile for *Watchkeeping Mate Restricted*, *First Mate Local Voyage* and *Master Local Voyage*, respectively.

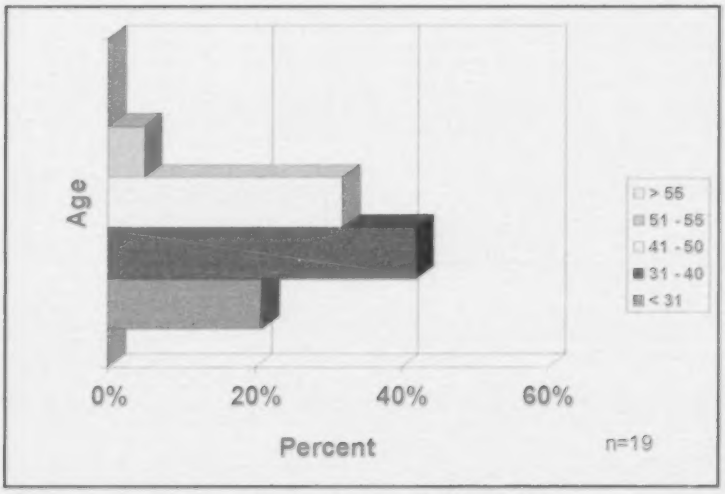


Figure 9 – Age Profile of Watchkeeping Mate Restricted

[14] Stakeholder Forum and Working Session Report, May 29, 2003, Presentation and Discussion of the Study "*Labour Market Assessment of the Offshore Oil and Gas Industry Supply and Service Sector in Newfoundland and Labrador*", Petroleum Industry Human Resources Committee (PIHRC), (p. 12).

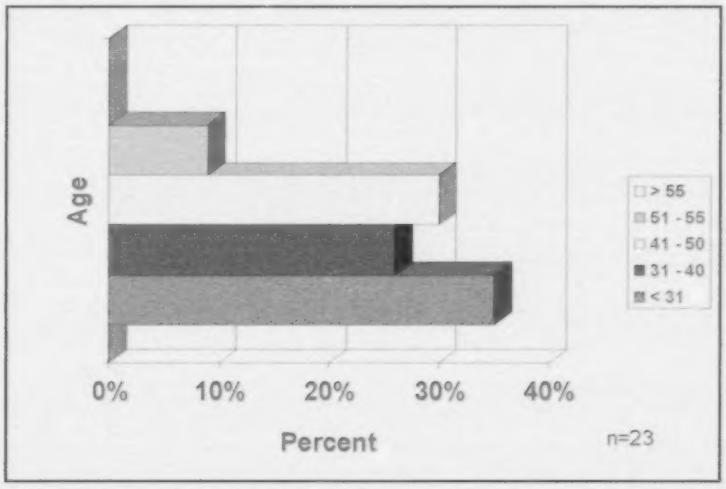


Figure 10 – Age Profile of First Mate Local Voyage

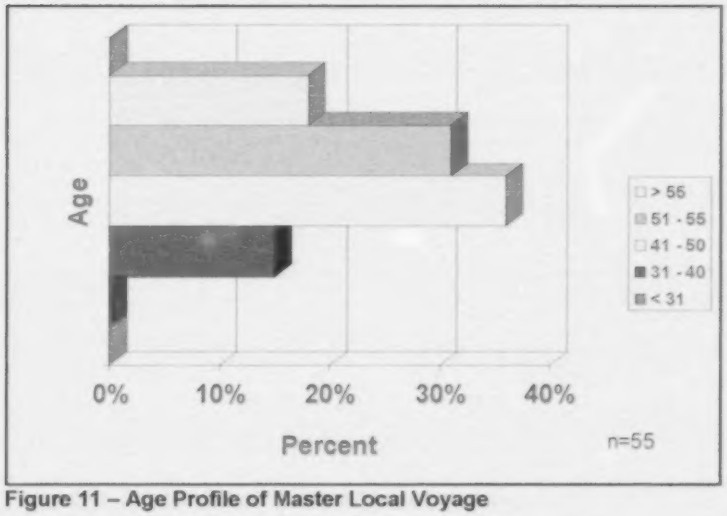


Figure 11 – Age Profile of Master Local Voyage

Master 350 Tonne

The age profile for *Master 350 Tonne* is presented in Figure 12.

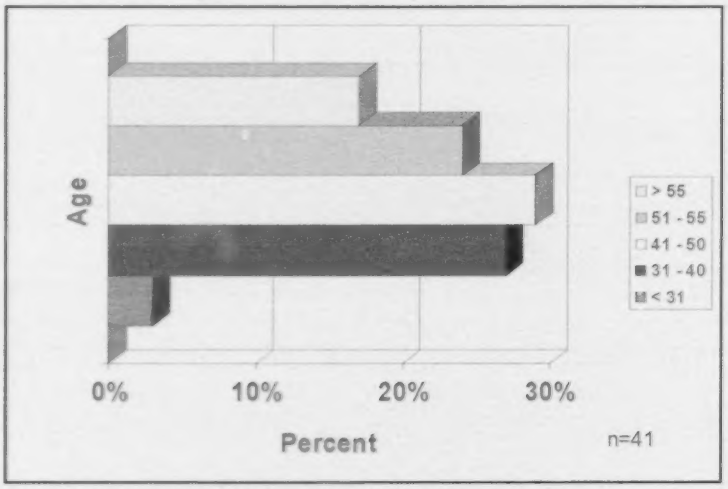


Figure 12 – Age Distribution of Master 350 Tonne

No issues were identified with the career path to *Master 350 Tonne*. The career path for *Master 350 Tonne* is short, with only one preceding certificate, namely *Watchkeeping Mate Restricted*. These vessels typically return to home port at night and therefore are attractive positions for a segment of the seafarers population.

3.3.2 Forecasts for Deck Officers

Of the 26 participating employers operating or crewing vessels, 11 companies reported retirements of deck officers over the last five-years, while the average retirement age for this group was 63, the majority of retirements occurred at 65 years of age. Many companies did not experience retirements during the last five-years. Unlike government and government agencies, private companies may not require retirement at 65 years of age.

Participating employers reported 13 deck officers left at-sea positions (retired, took shore-based employment, etc.) in 2003.

Participating employers were asked to forecast the number of certificate holders expected to leave at-sea deck officer positions in the next five and ten-years. One hundred and twenty-five deck officers were forecast to leave at-sea positions during the period 2004 to 2008 and 112 during the period 2009 to 2013, for a total of 237 during the ten-year period.

The age profile for deck officers provided by participating employers indicates 175 deck officers were more than 50 years of age in 2003. However, as shown in Table 3, only 59 of these will reach age 65 by 2013. The total forecast of 237 certificate holders expected to leave at-sea deck officer positions by 2013, represents 36% of those employed in 2003, or 23 a year for each of 10 years.

Survey Results	Employed in 2003	Age 65 by 2013	% of those Employed in 2003 Reaching Age 65 by 2013
Master Mariner Career Path			
Master Mariner	100	10	10%
Master, Intermediate Voyage	109	12	11%
First Mate, Intermediate Voyage	110	3	3%
Watchkeeping Mate, Unrestricted	176	13	7%
Master Local Voyage Career Path			
Master, Local Voyage	55	10	18%
First Mate, Local Voyage	23	2	9%
Watchkeeping Mate, Unrestricted	Same as shown above		
Master, 350 Tonne Career Path			
Master, 350 Tonne	59	9	22%
Watchkeeping Mate, Restricted	19	0	5%
Total	**651**	**59**	**9%**

Table 3 - Number of Certificate Holders in Deck Officer Career Paths Reaching Age 65 by 2013

Mobility

In 2003, 11 deck officers left at-sea positions to seek at-sea positions with other companies.

Participating employers were asked to forecast the number of certificate holders expected to leave at-sea positions to seek at-sea positions with other companies. Forty-three and 42 certificate holders were forecast to leave an at-sea position with an employer for another at-sea position with another employer, during the period 2004 to 2008, and 2009 to 2013, respectively.

3.3.3 Engineering Officers

Of 691 engineering officers reported by participating employers, 7% (46) were under 31 years of age, 24% (164) were 31 to 40 years of age, 35% (239) were 41 to 50 years of age, 15% (107) were 51 to 55 years of age, and 20% (135) were over 55 years of age. This age profile is presented in Figure 13.

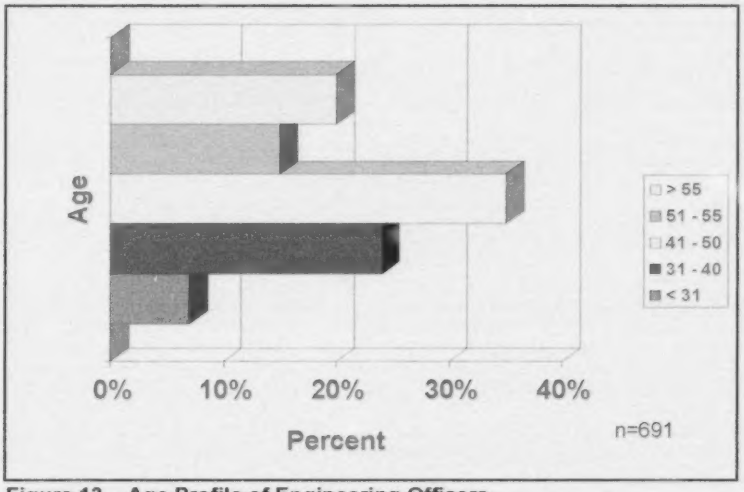


Figure 13 – Age Profile of Engineering Officers

Compared to the age profile of deck officers, engineering officers were an older group with 35% (239) more than 50 years of age. For each certificate level, *First Class Marine Engineer* through *Fourth Class Marine Engineer* the percentage of certificate holders more than 50 years of age were *First Class*, 36%, *Second Class*, 28%, *Third Class*, 46% and *Fourth Class*, 34%.

Marine Engineer certificates are progressive; therefore, it is a reasonable conclusion that the high percentage of certificate holders who have chosen not to progress beyond *Fourth Class Marine Engineer* and *Third Class* may contribute to career planning issues. This is compounded by the high percentage of certificate holders more than 50 years of age in each of the subsequent certificate levels.

The minimum time to complete the career path from the entry-level position Engine Watch Rating to *First Class Marine Engineer* is seven years (based on a schedule of two months at-sea and one month ashore). The minimum duration of the career path is slightly longer than for a *Master Mariner* certificate.

The largest cohort in each of *First Class Marine Engineer* through *Fourth Class Marine Engineer* certificate holders was 41 to 50 years of age. Figures 14, 15, 16, and 17 present the age profile for *Fourth Class Marine Engineer* though *First Class Marine Engineer*, respectively.

Fourth Class Marine Engineer

The age profile for *Fourth Class Marine Engineer* presented in Figure 14, indicates that 34% (78) of *Fourth Class Marine Engineer* certificate holders were more than 50 years of age and an additional 29% (57) were 41 to 50 years of age. In other words, of 199 *Fourth Class Marine Engineer* certificate holders, 125 were more than 40 years of age. Since this is an entry-level certificate, it indicates there is a bottleneck, which impacts the availability of positions for new entrants or graduates.

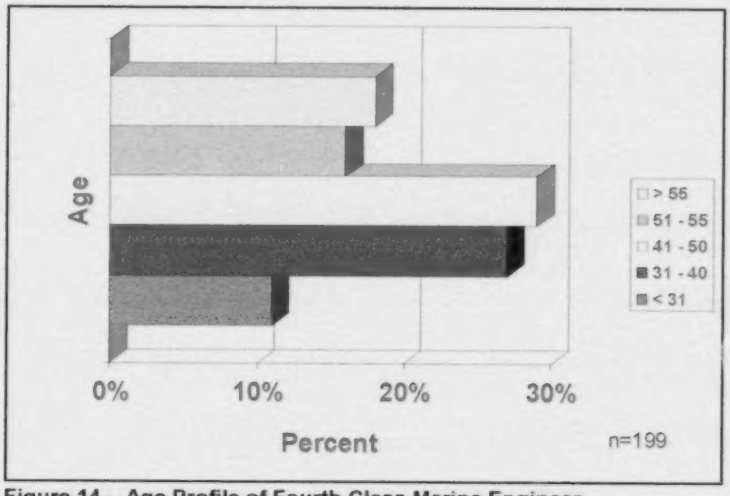


Figure 14 – Age Profile of Fourth Class Marine Engineer

Third Class Marine Engineer

Of 127 *Third Class Marine Engineer* certificate holders reported by participating employers, 46% (59) were more than 50 years of age, and 28% (35) were 41 to 50 years of age. It should be noted, that for some classes of vessels the senior marine engineering position onboard is Chief Engineer, which requires a *Third Class Marine Engineer* certificate. It is unknown how many of the *Third Class Marine Engineer* certificate holders identified by the participating employers are employed in Chief Engineer positions. This alternate career path means fewer individuals will progress to *Second Class Marine Engineer.* However, information is not available from the survey to determine the impact.

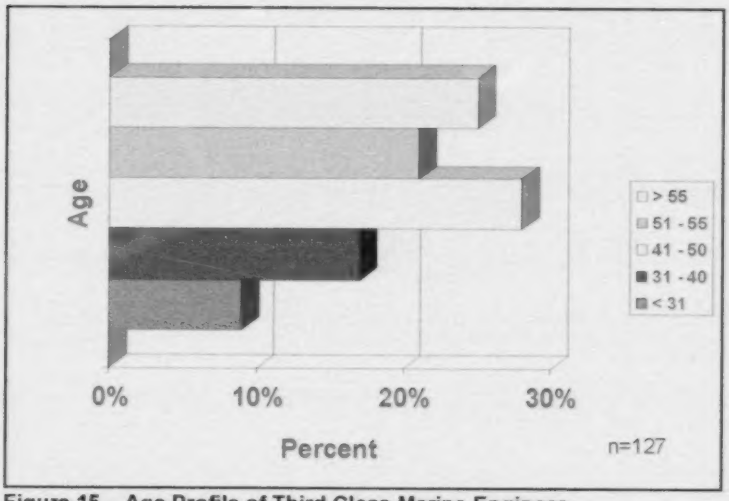


Figure 15 – Age Profile of Third Class Marine Engineer

Second Class Marine Engineer and First Class

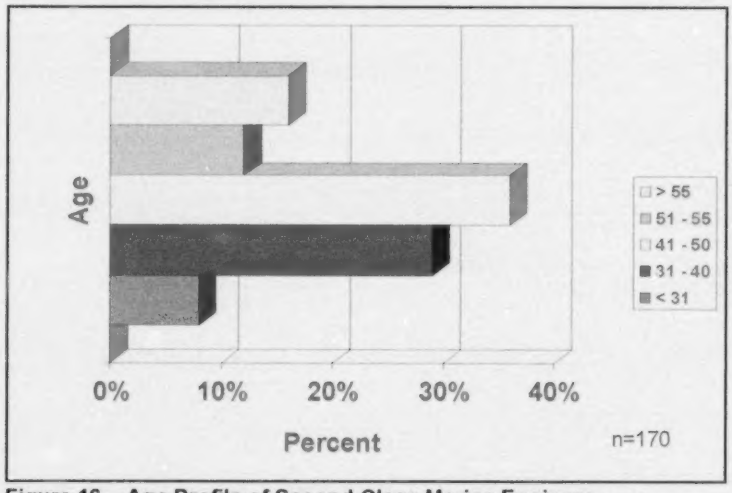


Figure 16 – Age Profile of Second Class Marine Engineer

The largest cohort of *Second Class Marine Engineer and First Class* certificate holders, were 41 to 50 years of age, approximately 36% (61) and 42% (68) respectively.

Only 1% (1) of the *First Class Marine Engineer* certificate holders was under 31 years of age. This is an anticipated result given that the minimum time to complete the career path is approximately seven years.

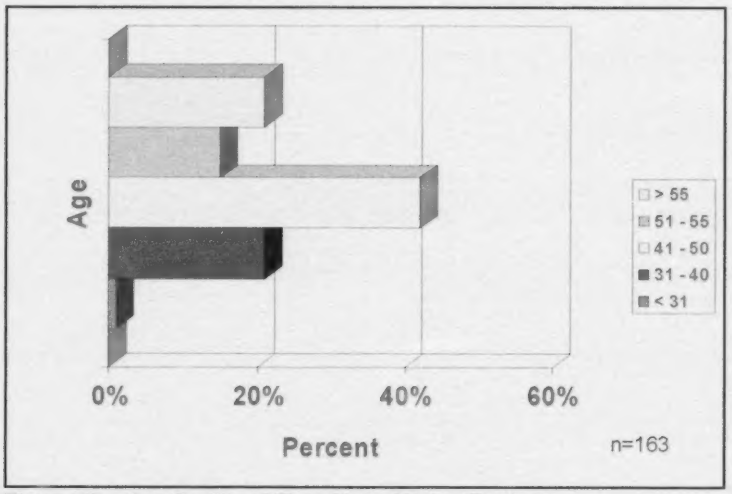


Figure 17 – Age Profile of First Class Marine Engineer

3.3.4 Forecasts for Engineering Officers

Of the 26 participating employers operating or crewing vessels, 11 employers reported retirement of engineering officers over the last five years with the average age being 63.

Participating employers reported 15 engineering officers left at-sea positions (retired, took shore-based employment, etc.) in 2003.

Participating employers were asked to forecast the number of marine certificate holders expected to leave at-sea engineering officer positions in the next five and ten-years. One hundred and six engineering officers were forecast to leave at-sea positions during the period 2004 to 2008 and 143 during the period 2009 to 2013, for a total of 249. This indicates that 36% of 691 engineering officers employed by these employers are forecast to leave at-sea positions over the next 10 years. For comparison, 242 engineering officers were more than 50 years of age in 2003, and as illustrated in Table 4, 135 of these will reach age 65 by 2013.

Survey Results	2003	Age 65 by 2013	% of those Employed in 2003 Reaching Age 65 by 2013
First Class Marine Engineer	163	35	21%
Second Class Marine Engineer	170	27	16%
Third Class Marine Engineer	127	32	25%
Fourth Class Marine Engineer	199	36	18%
Other	32	5	16%
Total	691	135	20%

Table 4 - Number of Certificate Holders in Marine Engineering Career Path Reaching Age 65 by 2013

On some vessels, the qualification for the senior engineering position, Chief Engineer, is *Third Class Marine Engineer*. It is a reasonable conclusion that those certificate holders employed in Chief Engineer positions may not pursue the next level of marine certificate.

Mobility

Participating employers reported that nine engineering officers left at-sea positions to seek at-sea positions with other companies in 2003.

Participating employers were asked to forecast the number of certificate holders expected to leave at-sea positions to seek at-sea positions with other companies over the next five and ten years. Forty-four and 45 engineering officers were forecast to leave an at-sea position with an employer for another at-sea position with another employer, during the period 2004 to 2008, and 2009 to 2013, respectively.

3.4 Employment Profile – Labour Demand

Of the 31 employers participating in the survey, 28 indicated whether they expected the number of persons employed to increase, decrease or remain the same by the years 2008 and 2013. Ninety-three percent of the participants expect employment to remain the same or increase by 2008 and 2013.

The anticipated increase in employment in Eastern Canada is supported by other studies.[15] Twenty-eight participating employers reported total employment of 5,341 for the occupations identified in the survey's Employment Matrix. This number is forecast to increase to 5,866 in 2008 and 6,176 in 2013.

It should be noted that many participating employers did not feel they could forecast their employment requirements for 2008 and 2013, even if they expected an increase. In these cases, the numbers provided for 2003 were carried forward to 2008 and 2013. Only one of the surveyed companies employing persons with marine certificates expected a decrease, and this company did not provide information regarding the anticipated rate of decrease. As a result, the employment forecast for 2008 and 2013 has not been reduced to reflect the impact of the decrease. In other words, it is likely the numbers for 2008 and 2013 may be somewhat understated and are to some extent speculative.

3.4.1 Marine Transportation and Offshore Petroleum Industries

Deck and Engineering Officers

Tables 5 and 6 present the participants' employment profile for deck and engineering officer certificate holders for 2003 and the forecast for 2008 and 2013.

The number of deck and marine engineering certificate holders reported in this section is higher than the numbers reported for the same certificates in Section 3.3 Age Profiles of Deck Officers and Engineering Officers. There are several reasons for the difference:

- More participants completed the Employment Matrix than the question requesting the age profile of deck and engineering officers. Determining the age profile was a labour intensive activity; and
- "Other", "back-up" and "cadet" positions were not included in the age profile for deck and engineering officers.

[15] *Here the Tides Flow – Career Opportunities in the Marine Transportation Industry,* Fisheries and Marine Institute of Memorial University of Newfoundland, June 1999, (p. 57), and Executive Summary of *Sectoral Profile – "Let's Not Miss the Boat",* Sectoral Committee of the Quebec Marine Industry, 2002, (p.16).

Position	2003	2008	2013
Master Mariner	147	204	241
Master, Intermediate Voyage	128	174	221
First Mate, Intermediate Voyage	131	189	225
Command Endorsement, 350 tonne	59	77	93
Master Local Voyage	69	65	49(1)
First Mate Local Voyage	53	47	39(1)
Watchkeeping Mate, Unrestricted	236	288	327
Watchkeeping Mate, Restricted	49	57	50(2)
Subtotal	872	1,101	1,245
Deck Officer (licensed) Back-up and other positions	34	41	48
Subtotal	906	1,142	1,293
Deck Officer Cadets	118	138	156
Total	1,024	1,280	1,449

Table 5 – Participants' Employment Profile for Deck Officers for 2003, 2008 and 2013

(1) Change offset by increases in certificates for Master, Intermediate Voyage and First Mate, Intermediate Voyage

(2) Decline in the demand for the certificate

Twenty-three participating employers reported 906 deck officer positions (excluding cadet positions) in 2003. Deck officer positions are forecast to grow 26% to 1,142 positions by 2008, and an additional 13% to 1,293 by 2013. These are conservative estimates, as they do not account for attrition and retirements.

The *Master, Local Voyage* is the only career path showing a reduction for the period. This is offset by increases in *Master, Intermediate Voyage* and *First Mate, Intermediate Voyage* certificates. *Watchkeeping Mate, Restricted* indicates a slight reduction in demand for this certificate.

Position	2003	2008	2013
First Class Marine Engineer	220	266	301
Second Class Marine Engineer	213	268	306
Third Class Marine Engineer	177	197	219
Fourth Class Marine Engineer	231	284	303
Subtotal	841	1,015	1,129
Other	60	60	60
Marine Engineer Officer Back-up Positions	32	42	48
Subtotal	933	1117	1237
Marine Engineer Officer Cadet	104	124	142
Total	1,037	1,241	1,379

Table 6 – Participants' Employment Profile for Engineering Officers for 2003, 2008 and 2013

Twenty-three participating employers reported 933 engineering officer positions. These positions are forecast to increase by 19.7% to 1,117 by 2008, and by 10.7% to 1,237 by 2013. The number of positions reported (current and forecast) for each engineering officer position is presented in Table 6.

Other At-Sea and Shore-Based Positions in the Marine Transportation and Offshore Petroleum Industries

Position	2003	2008
Cook	340	418
Chief Steward	29	53
Caterers	129	223
Catering Personnel Back-up Positions	56	82
Porters[16]	60	17
Bridge Watch Rating (Deckhand/Able Seaman/Rigger)	1,187	1,326
Engine Watch Rating (Engine Room Asst)	267	299
Back-up Ratings	234	236
Ships Clerk/Purser/Other Shipboard Administration	32	34
Dynamic Positioning (DP) Operator[17]	10	15
Marine Crane Operator	17	37
Marine Electrical Technician	55	85

[16] Porter positions are being grandfathered by several companies and will be phased out by some companies by 2008.

[17] Dynamic Positioning (DP) Operator is a certificate most often held by senior deck officers, and is usually not a dedicated position on a vessel.

Position	2003	2008
Marine Electronics Technician	10	11
Instrumentation Technician	21	23
Marine Welder-Plater	4	12
Motorman-Oiler	101	98
Other - Maintenance Personnel	56	58
Production Technician	20	38
Radio Operator	15	32
Marine Superintendent-Operations Manager	46	51
Safety Manager	13	17
Logistics Scheduling	21	23
Other – Shore-based Administrative Personnel	30	33
Naval Architect	10	13
Naval Architectural Design Technologist	1	2
Marine Engineering Design Technologist	4	4
Draftsperson-CADD Operator	2	2
Total	2,770	3,242

Table 7 – Participants' Employment Profile for Other At-Sea and Shore-based Positions for 2003, and 2008

For the participating employers, the total employment of the at-sea and shore-based positions identified in Table 7 is expected to increase by 17% from 2003 to 2008. Unfortunately, some employers could not provide forecasts for 2013 and were not comfortable carrying forward the same projections as 2008.

Fabrication Sector - Marine Transportation and Offshore Petroleum Industries

Six companies in Eastern Canada involved in the shipbuilding and repair industry including fabrication work for oil and gas projects participated in the survey. Due to the project-oriented work of some of the participants, and the fact that one of the participants is operating in receivership, forecasts for employment of the occupations for 2008 and 2013 are not available.

Table 8 provides the 2003 employment profile for the occupations in the Employment Matrix relevant to the participating employers from the shipbuilding and repair industry including fabrication work for oil and gas projects.

Position	2003
Marine Electrical Technician	1
Marine Electronics Technician	-
Instrumentation Technician	6
Marine Rigger	32
Marine Welder-Plater	270
Other	15
Marine Superintendent-Operations Manager	19
Safety Manager	6
Logistics Scheduling	6
Other	14
Naval Architect	12
Naval Architectural Design Technologist	18
Marine Engineering Design Technologist	11
Engineering Technologist[18]	38
Draftsperson-CADD Operator	62
Total	510

Table 8 – Participants' Employment Profile for Fabrication Related Positions for 2003

3.4.2 Cadet Positions

Of 32 participating employers in the survey, 25 employers reported marine certificate level permanent full-time or seasonal positions. Twelve companies indicated they offer cadet positions for deck officers, providing a total of 118 official cadet positions per year.

Ten companies offer cadet positions for engineering officers, providing a total of 104 cadet positions per year.

One company offers six cadet positions for electrical officers.

The lakes companies are large and offer 45% of the cadet positions reported by the companies surveyed.

The reasons why other participating employers do not offer positions to cadets included:

- In some unionized organizations, it is difficult for cadets to gain hands on experience as they are not permitted to perform the tasks/functions of a unionized position; and
- Crewing companies and vessels operated under contract require the clients' concurrence to hire cadet positions, so the availability of cadet positions is variable over time.

[18] Participants did not specify whether these were naval architecture or marine engineering technologists.

The most commonly reported initiative to fill entry-level positions in which companies participate with training institutions is cadet programs.

Several survey respondents noted that high numbers of new graduates are finding placements internationally. Other studies also refer to this point. "The academic path attracts close to 400 students for all five programs (naval architecture, navigation, marine engineering, transportation logistics, professional diving), each of which has a job placement rate that is close to 100%. It is also interesting to note that approximately 50% of the students who have graduated over the last five-years have found jobs outside Canada. This is perhaps not surprising when we consider that from 1996 to 2001, the percentage of apprenticeships at-sea outside Canada rose from 36% to 64%."[19]

"Unfortunately, the market for cadet placements is becoming increasingly competitive. Junior level cadets, in particular, need a high level of supervision and are of limited immediate value to the employer. At this level, employers make a significant investment in training. The return on investment may not begin to be realized until the cadets have received further training and will not be fully realized until after their graduation. European training institutions are dealing with the competitive nature of at-sea cadet placement by providing training allowance to hosting employers. (Internationally, many European countries provide incentives to shipping companies. The United Kingdom, Norway, and Denmark all provide incentives in the form of wage and travel subsidies and/or tax breaks. Within Canada, both British Columbia and Quebec have also offered incentives to shipping companies for the hiring of cadets and officers. The Quebec government levies a tax on all ships entering the St. Lawrence Seaway. This revenue is then turned over to marine training institutions where shipping companies are giving $20.00/day ($560 month) for each cadet as an incentive for hiring. In British Columbia the provincial government, through a Skills Now initiative has provided an incentive to shipping companies in the amount of $1,000/month for the hiring of officers.) These allowances are intended to contribute to the costs of berthing, transportation to ships, and the on board training and supervision by ships' officers. Most frequently these subsidies are provided to training institutions by governments and then disbursed through the appropriate channels to assist employers who place cadets. Industry maintains, however, that the main reason for taking cadets is to provide real life experience which enhances training and assists in the development of human resources in the marine sector. Without subsidy programs, employers argue, they would not recover the costs associates with training cadets. Moreover, national and international regulations require increasing levels of supervision, evaluation, and documentation of cadets' sea time experience. The fact that other countries regularly provide such subsidies makes it increasingly difficult for Canadian training institutions to obtain international placements without subsidization."[20]

"... the absence of financial incentives is a barrier "[21] for cadets from Newfoundland and Labrador.

"Additional 'supply' issues are exposed through the relatively small number of projected cadet graduates, and the industry's lack of employment equity. The significant international demand for officers while extending the range of jobs for junior and senior officers, simultaneously compounds the replacement challenges facing the Great Lakes fleets."[22]

19 Executive Summary of *Sectoral Profile – "Let's Not Miss the Boat"*, 2002, (p. 15).
20 *Here the Tides Flow – Career Opportunities in the Marine Transportation Industry*, June 1999, (pp. 79-80).
21 Ibid., (p. 90).
22 *Making Waves – A Profile of Career Opportunities in Niagara's Marine Sector*, 2000 (p. 6).

"... (The) ageing fleet, which will soon require significant investment in infrastructure and shipbuilding," is an opportunity for the shipbuilding sector.[23]

3.4.3 Entry-Level Positions

Twelve participating employers provided estimates of the number of entry-level deck and engineering officer positions for which they recruit each year. The total number of entry-level positions for this group per year ranges from 143 to 181 positions.

Of the 25 employers surveyed, 10 estimated they offer more than 80 entry-level positions a year. Some employers who offer cadet placements indicated the job performance of the cadets during the cadet placements is a factor in the recruitment and selection process for entry-level positions.

Of the 25 companies responding to the question "where do you typically recruit entry-level recruits", 68% indicated that they recruit internally and externally, 20% that they recruit externally and 12% that they recruit internally.

Of the 27 companies responding to the question "In terms of external recruitment of entry-level recruits, where do you recruit", 70% responded that they recruit in Eastern Canada, 26% responded that they recruit nationally, and 4% responded that they recruit internationally. Fifty-two percent of the 27 companies responding indicated they recruit at institutions for entry-level recruits.

The certificate levels "which are competitive internationally, i.e., First Mate, Intermediate Voyage, and Third Class Marine Engineer, ... adhere to international standards. The fastest route to allow deck officers and engineers to obtain the necessary experience to qualify for positions in the offshore oil and gas industry which adhere to international standards is through international companies operating in the North Sea, Mediterranean, Asia, etc."[24]

Typically, entry-level positions are unlicensed marine positions. If the company is unionized or is a government agency or government department, the collective agreements may require the employers to hire entry-level positions through the union.

It is a common practice to hire entry-level positions to replenish the relief pool, as senior people in the relief pool are offered permanent entry-level positions.

3.4.4 Recruitment of Experienced Personnel

Eighteen employers responded to the question "where do you typically recruit experienced recruits". The majority of these employers recruit internally and externally for experienced personnel. The majority recruit in Eastern Canada.

---

23 Ibid.

24 *Here the Tides Flow – Career Opportunities in the Marine Transportation Industry*, June 1999, (p. 90).

3.4.5 Employment of Females

Participating employers reported that 146 females were employed at-sea.[25] As reported in Table 9, more than 65% (96) of females were employed in catering positions, specifically as cooks, stewards, assistant stewards, and caterers. Eight percent (11) were employed in deck officer positions, and 3% (4) in engineering officer positions. Eighteen percent (26) were employed in unlicensed marine positions, specifically 16% (23) in deckhand positions, and 2% (3) in engine room assistant positions. Three percent (4) of females were employed in onboard administration positions (Ships Clerk), 1% (2) in specialist positions (Ballast Control Operator, Dynamic Position Operator), and 2% (3) did not identify the positions in which females were employed.

Position	Number of females employed	% of total females employed
Catering – Cooks, Stewards, Assistant Stewards and Caterers	96	65%
Deck Officers	11	8%
Engineering Officers	4	3%
Deckhands	23	16%
Engine Room Assistant	3	2%
Onboard Administration (Ships Clerk)	4	3%
Specialist Positions (Ballast Control Operator, Dynamic Position Operator),	2	1%
Missing Data	3	2%
Total Number of Females Employed in At-sea Positions	**146**	**100%**

Table 9 – Females Employed in At-Sea Positions

The small number of females employed in at-sea occupations, and the smaller subset of the group of females who work in non-traditional occupations, is also represented in Census 2001 employment information for the water transportation industry.[26] The Census 2001 data reports 6% (305) of deck officers in Canada are female, and of those 30% (90) work full-year, full time. Similarly, 8.7% (410) deck crew in Canada are female and of those 26% (105) work full-year, full time. The number of females working as engineering officers or engine room crew in Canada was not available under the reporting guideline that if a population is less than 250 in any category, it is not reported by Statistics Canada.

---

[25] One participant reported more than 200 positions for females in catering positions, assistant stewards, which were not included in the total employment for 2003 and therefore are not included in this section.

[26] Statistics Canada's report *Number and Average Employment Income (2) in Constant 2000 Dollars, Sex (3), Work Activity (3) and Occupation – 1991 Standard Occupational Classification (Historical) (707A) for Population 15 Years and Over With Employment Income for Canada, Provinces, Territories and Census Metropolitan Areas, 1995 and 2000 – 20% Sample Data.* This Report uses data from 2001 Census.

Of the onshore positions considered in this study, only the Marine Superintendent/Operations Manager position requires marine specific training, and participating employers report females hold none of these positions.

3.4.6 Barriers to Females in At-Sea Occupations

Of the 22 companies that responded to the question "what are the barriers to employment of females in at-sea positions", 13 companies responded there were no barriers to females to employment in at-sea occupations. The other participating employers indicated receiving few applications from females for at-sea positions, and others noted that few females have the required training and experience for the positions. Lack of separate accommodations on older vessels was also indicated as a barrier to females.

Other Canadian studies have reported a small number of women employed in the industry. "Employers from our sample suggested looking to the industry's employment equities as a potential source for increasing recruits. Women were identified as one of the untapped potential labour force sources. With women representing only 3% of our sample's respondents, industry employers may be accurate about their 'untapped potential'; albeit, perhaps overly optimistic of their willingness to enter the industry without significant changes in the milieu of life on-board."[27]

"Internationally, women represent less than 2% of the world's 1.25 million seafarers, with the majority working as cooks, porters, or waitresses in the cruise segment of the industry. European Union fleets fair a little better, with women representing 4-5% of their total workforce. The socio-cultural factors impeding the integration of women onboard have deep roots in most countries. And although we may wish to think Canada is different, our findings (through both employer interviews and respondent questionnaires) suggest that we too need to improve not only our (hiring) numbers, but also our support for the integration of female mariners.

The International Maritime Organization (IMO) was the first organization to develop a formal strategy for the integration of women into the marine sector. The *IMO Women In Development Programme* was initiated in 1989, and offers the best resource for learning how to enhance marine training and jobs for women. Their experience suggests the need for multifaceted interventions, including, but not limited to, the following areas:

- Gender-Awareness Training across the sector;
- Gender-specific Fellowships;
- Shorter voyages and/or longer home leave; and
- Improved on-board accommodation and facilities.

The IMO also notes that the strategies above not only attract more women to the marine professions but also benefits all seafarers, regardless of gender."[28]

3.4.7 On-Board Personnel by Province and by Industry

Twenty-six participating employers responded to the question "what is the home residence of your on-board personnel by province". The total number of employees

[27] *Making Waves – A Profile of Career Opportunities in Niagara's Marine Sector*, 2000, (p. 32).
[28] Ibid., (pp. 32-33).

accounted for in the response to this question was 3,408 and the distribution by province is presented in Figure 18.[29]

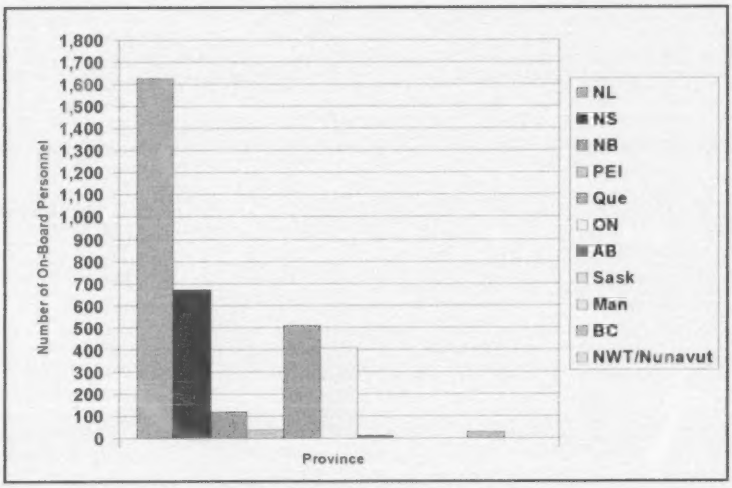


Figure 18 – Onboard Personnel by Province

Figure 19 illustrates the number of onboard personnel by industry. Approximately 48% of the onboard personnel reported were employed by companies operating in the marine transportation industry, 34% were employed by companies operating in both the marine transportation and offshore petroleum industries, and 19% were employed by companies operating in the offshore petroleum industry.

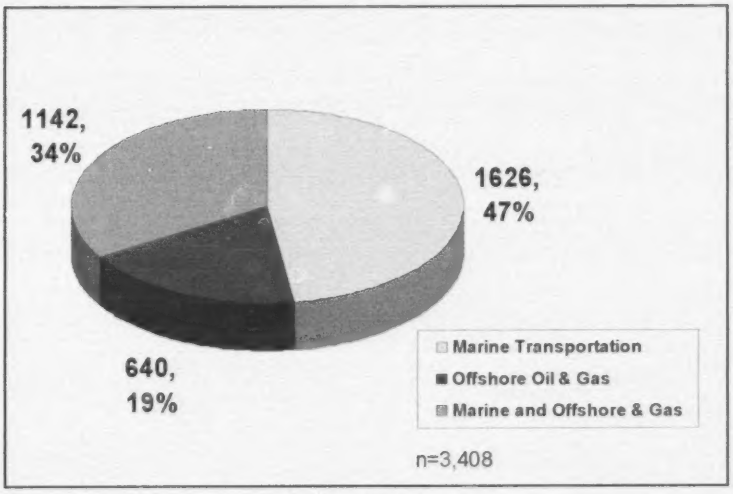


Figure 19 – Onboard Personnel by Industry

[29] *This number can not be reconciled to other questions.*

4.0 "Difficult to Recruit" Occupations

Based on their recruitment experience, participating employers were asked to identify the occupations they found difficult to recruit. "Difficult to recruit" means it takes a longer time to recruit a qualified candidate; the recruitment effort is extended to other provinces, or countries, etc.

The factors most often cited by participating employers as affecting individual companies' personnel recruitment were:

- Work rotation and leave, which includes:
  - Leave system – specific issues identified were the lack of an adequate leave system on the Great Lakes and the different at-sea and onshore rotation used by the offshore petroleum industry;
  - Requirement to be away from home is a disincentive, particularly when shore-based positions are available; and
- Supply and demand.

Other factors noted as affecting individual companies' personnel recruitment (in no particular order) were:

- In unionized areas, there is a requirement for seniority as well as qualifications;
- For some occupations, the availability of shore-based employment in other industries. For example, marine engineers are recruited for positions in the nuclear industry;
- Salary differences among industries such as the marine transportation and the offshore petroleum industries;
- Increased requirements for certification and the associated increased costs; and
- As a career choice, seafarer occupations are generally not well known or understood. There is lack of knowledge and awareness of the career options, lifestyle and the level of income available.

Some companies indicated experiencing difficulty in trying to motivate their employees to acquire higher levels of marine certificates.

"The marine occupations, Master Mariner, First Mate, Chief Engineer and Second Engineer have proved to be difficult to hire and retain for the Terra Nova FPSO. Some of the issues are:

i. A highly competitive international market for navigation and engineering officers;
ii. The marine roles on a FPSO are different while the vessel is on location, from those on a ship. For example, Master Mariner is not in-charge unless the vessel disconnects;
iii. The shift rotation is different. The workload is greater on the FPSO in terms of 12 hours a day for 21 days and the work assignments are more varied than marine positions;
iv. Career progression opportunities are limited in a "one of" environment; and
v. The work experience gained does not qualify for sea time required for successive Transport Canada marine certificates."[30]

[30] *Labour Market Assessment of the Offshore Oil and Gas Industry Supply and Service Sector in Newfoundland and Labrador*, Petroleum Industry Human Resources Committee, 2003, (pp. 7-8).

4.1 "Difficult to Recruit" – Deck Officer Certificates

The deck officer certificates identified by the participating employers as "difficult to recruit" are presented in Table 10. (The deck officer certificates not listed in Table 9 were not identified as "difficult to recruit".)

Position	Number of participating employers reporting employment for certificate in 2003	Number of participating employers identified the certificate as "Difficult to Recruit"	Number of participating employers identified the certificate as "Difficult to Retain"
Master Mariner	14	7	5
Master, Intermediate Voyage	16	5	2
Mate, Intermediate Voyage	15	4	4
Master, 350 Tonne	9	3	-

Table 10 - "Difficult to Recruit" - Deck Officer Certificates

It should be noted that *Mate, Intermediate Voyage* is the next certificate beyond the entry-level *Watchkeeping Mate, Unrestricted* certificate.

4.2 "Difficult to Recruit" – Engineering Officer Certificates

The engineering officer certificates identified by the participating employers as "difficult to recruit" are presented in Table 11.

Position	Number of participating employers reporting employment for certificate in 2003	Number of participating employers identified the certificate as "Difficult to Recruit"	Number of participating employers identified the certificate as "Difficult to Retain"
First Class Marine Engineer	15	12	8
Second Class Marine Engineer	19	12	8
Third Class Marine Engineer	17	4	3
Fourth Class Marine Engineer	18	2	-

Table 11 - "Difficult to Recruit" - Engineering Officer Certificates

Several reasons contribute to the difficulty experienced by participating employers in recruiting *First Class Marine Engineer* and *Second Class* certificates:

- Shortage of people with these qualifications, based on recruitment experience. This was the most often cited reason;
- Opportunities available for shore-based employment in other industries;
- Competing with higher salaries offered by other industries such as the offshore petroleum industry;
- Difficulty attracting people to those positions, which are seasonal. The majority of positions are full-time positions; and

- Less popular occupational choice than deck officer and fewer people are entering college marine engineering programs. In terms of physical work environment, the engine room may be viewed as a less desirable place to work.

For the deck and engineering officer certificates identified as "difficult to recruit", many were also identified as "difficult to retain".

4.3 "Difficult to Recruit" – Specialist Positions

Of four participating employers reporting Marine Crane Operator positions, two identified it as "difficult to recruit". Both participating employers are in the offshore sector and the reason the position was identified as "difficult to recruit" is applicants' lack of offshore experience.

4.4 "Difficult to Recruit" – Maintenance Positions

The maintenance positions identified by the participating employers as "difficult to recruit" are presented in Table 12.

Position	Number of participating employers reporting employment for position in 2003	Number of participating employers identified the position as "Difficult to Recruit"	Number of participating employers identified the position as "Difficult to Retain"
Marine Electrical Technician	9	3	1
Marine Electronics Technician	4	1	1
Instrumentation Technician	4	1	0

Table 12 - "Difficult to Recruit" - Maintenance Positions

Of nine participating employers reporting Marine Electrical Technician positions, three identified it as "difficult to recruit". Only one company identified it as "difficult to retain".

Of four participating employers reporting Marine Electronics Technician positions, one identified it as "difficult to recruit" and another company identified it as "difficult to retain".

Of four participating employers reporting Instrumentation Technician positions, one identified it as "difficult to recruit".

4.5 "Difficult to Recruit" – Shore-Based Administrative Positions

The shore-based administrative positions identified by the participating employers as "difficult to recruit" are presented in Table 13.

Position	Number of participating employers reporting employment for position in 2003	Number of participating employers identified the position as "Difficult to Recruit"	Number of participating employers identified the position as "Difficult to Retain"
Marine Superintendent Operations Manager	20	3	0
Safety Manager	16	4	1

Table 13 - "Difficult to Recruit" – Shore-Based Administrative Positions

Of 20 participating employers reporting Marine Superintendent/Operations Manager positions, three participating employers identified it as "difficult to recruit". No participating employers identified it as "difficult to retain".

Of 16 participating employers reporting Safety Manager positions, four participating employers identified it as "difficult to recruit". Only one company identified it as "difficult to retain".

4.6 "Difficult to Recruit" – Design Positions

The design positions identified by the participating employers as "difficult to recruit" are presented in Table 14.

Position	Number of participating employers reporting employment for position in 2003	Number of participating employers identified the position as "Difficult to Recruit"	Number of participating employers identified the position as "Difficult to Retain"
Naval Architect	6	2	1
Naval Architectural Design Technologist	5	1	0
Marine Engineering Design Technologist	7	1	0
Engineering Design Technologist	7	1	0
Engineering Technologist	6	1	0
Draftsperson/CADD Operator	7	1	1 (different company)

Table 14 - "Difficult to Recruit" - Design Positions

Of six participating employers reporting Naval Architect positions, two participating employers identified it as "difficult to recruit'. Only one company identified it as "difficult to retain".

Of five participating employers reporting Naval Architectural Design Technologist positions, one company identified it as "difficult to recruit".

Of seven participating employers reporting Marine Engineering Design Technologist positions, one company identified it as "difficult to recruit".

Of seven participating employers reporting Engineering Design Technologist positions, one company identified it as "difficult to recruit".

Of six participating employers reporting Engineering Technologist positions, one company identified it as "difficult to recruit".

Of seven participating employers reporting Draftsperson/CADD Operator positions, one company identified it as "difficult to recruit". A different company identified it as "difficult to retain".

A shortage of naval architects is also mentioned in the report "*A Situational Analysis of Human Resource Issues in the Shipbuilding and Industrial Marine Industry in Canada*". Other occupations experiencing shortages in the study were electricians, pipefitters, engine fitters and naval architects. The study noted employers in Atlantic Canada indicated there was an adequate supply of labour in these occupations.[31] The study also reported difficulty in recruiting experienced managers in the industry.

4.7 Factors that Affect Retention

Marine Transportation

For the majority of certificates and positions identified as "difficult to recruit", fewer participating employers identified these certificates and positions as "difficult to retain". Several participating employers noted that they did not experience retention issues.

The most often cited factors that affect retention by employers are:

- Work rotation and leave with respect to time away from home was most often cited;
- Opportunities for other positions;
- Competitive salaries within the industry;
- Continuous employment versus seasonal employment; and
- Able to progress in marine careers and challenging positions.

Several participating employers noted why people stay than leave. These factors include a positive work environment, proximity to home (e.g., vessels that return to home port at night), leave system, competitive salary and pension and sick leave benefits.

Shipbuilding and Repair Industry including Fabrication Work for Oil and Gas Projects

Participating employers operating in the shipbuilding and repair industry including fabrication work for oil and gas projects identified the following sector specific factors which affect retention:

- The cyclical nature of the work in Canada; and
- Higher salaries and more job opportunities in other countries (e.g., United States) for experienced production engineers, draftspersons, and architects have resulted in some loss of personnel.

[31] *A Long Way Back - A Situational Analysis of Human Resource Issues in the Shipbuilding and Industrial Marine Industry in Canada*, March 31, 2003, Praxis Research and Consulting Inc. for HRP//HRDC Sectoral Partnerships Division, Executive Summary, (p. 39).

5.0 Labour Supply

5.1 Introduction

The labour supply information reviewed for the study includes:

- The number of Employment Insurance claimants in occupations identified in the Employment Matrix; and
- College graduates from marine training programs that are 12 months or more duration.

5.1.1 Employment Insurance Claimants

One of the key elements/indicators of the labour supply is the number of people available for work in an occupation.

Information was obtained regarding the number of Employment Insurance claimants during the period October 2002 to September 2003, starting a claim and reporting qualifications in the marine or related occupations noted. It is important to note, claimants self-identify their occupation, and are not required to prove possession of the necessary qualifications for the occupation. For example, a person may record their occupation as a master on a vessel. They are not required to provide proof of the required Transport Canada certificate corresponding to that position.

The total employment insurance claimants for each occupation included claimants from Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Quebec and Ontario. The industries included water transportation (North American Industry Classification System (NAICS) 483) which includes ferries and the Great Lakes activity, oil and gas extraction (NAICS 211), support activities for mining oil and gas extraction (NAICS 213) and ship and boat building (NAICS 3366). Detailed descriptions for each of these NAICS codes are presented in Appendix C.

The occupations investigated in the study were matched, as far as possible, with National Occupational Classification (NOC)[32] as presented in Table 15. However, the NOC data has a number of limitations:

- While some occupations such as deck officers appear to be a good match, they do not provide sufficient detail to be directly comparable to the survey results. For example, the survey results indicate industry is experiencing difficulty recruiting senior deck officers with *Master Mariner* certificates, etc. The NOC Deck Officer information does not provide any detail with respect to marine certificates, therefore the number, if any, of claimants with *Master Mariner* certificates can not be identified;
- The number of claims does not necessarily equal the number of persons, as individuals may have started more than one claim during the period;
- Some portion of the claimants are not available for employment such as seasonal workers and those workers participating in training programs; and
- As mentioned earlier, Employment Insurance claimants self-identify their occupation, and possession of the qualifications for the occupation are not verified.

[32] National Occupational Classification (NOC) is a standardized system of describing occupations and the nature of the work for various occupations in Canada. www.hrsdc.gc.ca

NOC	Study Occupation Title	NOC Title	Number of Claims Started
1215	Logistics Supervisor – Transportation	Supervisors, Recording, Distributing and Scheduling Occupations	<10
1474	Ship Supply Clerk	Purchasing and Inventory Clerks	<10
1475	Marine Radio Operator	Marine Radio Operator	10
1476	Logistics Clerk	Transportation Route and Crew Schedulers	< 10
6242	Cook	Cooks	254
6432	Chief Steward, Ship	Pursers and Flight Attendants	30
6453	Caterers	Food and Beverage Servers	196
7263	Marine Welder / Plater	Structural Metal and Platework Fabricators and Fitters	203
7265	Marine Welder / Plater	Welders and Related Machine Operators	652
7242	Industrial Electricians	Industrial Electricians	111
7311	Industrial Mechanic/ Marine Rigger	Construction Millwrights and Industrial Mechanics	167
7433	Bridge Watch Rating (Deckhand)	Deck Crew, Water Transportation	891
7434	Engine Watch Rating (Engine Room Assistant)	Engine Room Crew, Water Transport	217
		Total Claims excluding those < 10	2821

Table 15 – Matching NOC and Study Occupation Titles (Source: HRDC January 14 and March 26, 2004)

The occupations identified as "difficult to recruit" by participating employers, and reported in Section 4.0 "Difficult to Recruit" certificates and positions are presented in Table 16.

For those occupations where the number of employment insurance claimants was less than ten, information was not provided by Human Resources and Skills Development Canada to ensure individuals' privacy is maintained.

Despite the fact the NOC used encompass a larger population of possible occupations being aggregated than the employment survey of employers in this study, the available labour pool from employment insurance claimants is not substantial for occupations that were identified as "difficult to recruit" by the participating employers.

NOC	Study Occupation Title	NOC Title	Number of Claims Started
112	Occupational Health & Safety Manager	Occupational Health & Safety Manager	< 10
713	Marine Superintendent / Operations Manager	Transportation Managers	10
2148	Naval Architect	Other Professional Engineers	48
2232	Marine Engineering Technologist	Mechanical Engineering	21

NOC	Study Occupation Title	NOC Title	Number of Claims Started
		Technologists and Technicians	
2241	Marine Electrical Technician / Marine Electronics Technician	Electrical & Electronics Engineering Technologists and Technicians	10
2243	Instrumentation Technician	Industrial Instrument Technicians and Mechanics	11
2251	Naval Architectural Design Technologist	Architectural Technologists and Technicians	<10
2253	Draftsperson/CADD Operator	Drafting Technologists and Technicians	14
2264	Safety Manager	Construction Inspectors	< 10
2273	Deck Officer	Deck Officers - Water Transport	293
2274	Engineering Officer	Engineer Officers - Water Transport	190
7371	Marine Crane Operator	Crane Operators	47
		Total Claims excluding those < 10	**644**

Table 16 – Corresponding Study Occupation Titles and NOC for "Difficult to Recruit" positions (Source: HRDC January 14 and March 26, 2004)

Conclusions

i. The match between the occupations which were identified as "difficult to recruit" by participating employers and the NOC titles which are not considered to be a good match (i.e., similar qualifications and experience requirement) are:

- The pairings Marine Superintendent/Operations Manager and NOC 713 Transportation Managers; and Naval Architect and NOC 2148 Other Professional Engineers;

  The NOC occupations aggregate a more diverse group of occupations than the study's participating employers.

- Deck Officer and NOC 2273 Deck Officers – Water Transport and Engineering Officer and NOC 2274 Engineering Officers – Water Transport; and

  The number of employment insurance claimants listing Deck Officers – Water Transport or Engineering Officers – Water Transport, are 293 and 190 respectively. However, as noted earlier this NOC does not differentiate among the eight marine transportation certificates such as *Master Mariner*, *Master Intermediate Voyage*, and *Mate Intermediate Voyage*. It is unlikely a high number of persons with senior marine certificates are included in the claimants, given the difficulty recruiting these certificates identified by the employers responding to the survey. Anecdotal evidence indicates these numbers may also include seasonal workers who are employed on the Great Lakes.

- Marine Crane Operator and NOC 7371 Crane Operators.

  Marine Crane Operators are "difficult to recruit" due to the lack of offshore experience so availability of a group of Crane Operators does not address this issue.

ii. The employment insurance data was also requested for a three-year period on a quarterly basis. The reasons for requesting the data in this manner was to identify the incidence of seasonal workers and workers who work a compressed work year (e.g., those employed on the Great Lakes) who are not available for hire, and to determine the labour supply trends. The number of employment insurance claimants in the occupations on this basis was so low that most of the information was suppressed. This further confirms the finding that there are not large numbers of individuals available in the occupations examined.

iii. One of the largest number of claimants was in the occupations marine welder/plater. Given the low volume of work in Canada's shipyards and the sporadic nature of the work available, it is not surprising there are a large number of people available in this occupation.

iv. There is a large number of Deck Crew, Water Transportation Employment Insurance claimants, 891 reported. The study results indicated there is no difficulty in recruiting unlicensed marine personnel which includes Bridge Watch Rating (Deckhand). Other studies such as BIMCO/ISF 2000 support this finding.[33] It is interesting to note the number of Employment Insurance claimants identified as Engine Room Crew, Water Transportation which is equivalent to the Engine Watch Rating (Engine Room Assistant) is only one quarter that of the Bridge Watch Rating (Deckhand). This appears to be consistent with other indications that navigation appears to be a more attractive career choice than engineering, fewer students enrol in the marine engineering than navigation programs, the population of marine engineers is older than their deck officer counterparts, and a greater proportion of the employers participating in the survey reported engineering officers as "difficult to recruit" than deck officers.

5.1.2 College Graduates

Of the nine colleges participating in the survey, namely, Georgian College, Institut maritime du Québec, Nova Scotia Community College, New Brunswick Community College, Niagara College, Holland College, Canadian Coast Guard College, Marine Institute, and College of the North Atlantic:

- Navigation and engineering cadet programs are offered by Georgian College, Institut maritime du Québec and the Marine Institute;
- Niagara College and New Brunswick Community College are not offering navigation and marine engineering programs which are 12 or more months in duration;
- Canadian Coast Guard College results were not included with the other colleges, as the full student complement enrolled has accepted offers of employment from the Canadian Coast Guard. The navigation and marine engineering programs are designed specifically for employment with the Coast Guard. Marine Engineer qualifications are transferable to other marine industry sectors (i.e., are equivalent to Transport Canada certificates), however, deck officer qualifications are not. The information collected regarding the Canadian Coast Guard is not presented; and
- Students graduating from courses at the College of the North Atlantic such as industrial electricians may become employed in the marine transportation or offshore petroleum industry however, the number of graduates is unknown. Since the cross-over for trades and technicians programs to the marine

[33] *BIMCO/ISF 2000 Manpower Update, The Worldwide Demand for and Supply of Seafarers, 2000.*

environment is unknown, graduates of College of the North Atlantic have not been included in the forecast of graduates.

Several participants remarked that the highest rate of student attrition from deck and marine engineering programs occurs after the first sea term.

The actual and forecast numbers of students graduating per year from academic marine programs for the years 2001 to 2013 are presented in Table 17.

Academic Program		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Duration
Deck Officer (Cadet) Program	Total Students Graduating per year	71	83	92	79	77	80	93	101	101	106	106	106	106	3 - 4 years
Engineering Officer (Cadet) Program	Total Students Graduating per year	61	40	59	48	37	61	62	67	67	67	69	74	74	3 - 4 years
Naval Architecture Program	Total Students Graduating per year	21	30	32	22	30	27	29	29	29	31	31	33	33	3 years
Maritime Engineering Systems Design Program	Total Students Graduating per year	8	8	8	8	8	8	8	8	8	8	8	8	8	3 years
Basic Marine Navigation	Total Students Graduating per year	16	16	16	16	16	16	16	16	16	16	16	16	16	1 year
Basic Marine Engineering	Total Students Graduating per year	16	16	16	16	16	16	16	16	16	16	16	16	16	1 year

Table 17 – Student Graduation per year in Academic Marine Programs for the years 2001 to 2013

Table 18 presents enrolment in Transport Canada Certificate Program courses, which are required to progress through the marine certificates. These courses are self-paced and may be repeated if necessary. The total student intake per year does not equate to individuals, as individuals may take several courses during the year, and may repeat courses.

Academic Program		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Duration
Deck Officer Transport Canada Certification Program	Total Student Intake per year	520	620	387	426	453	463	474	487	496	504	488	497	506	Varies
Engineering Officer Transport Canada Certification Program	Total Student Intake per year	266	255	193	220	228	237	245	259	269	279	299	310	321	Varies

Table 18 – Enrolment in Continuing Education Courses per Year 2001 to 2013

Conclusion

The survey results indicate fewer students are graduating or forecast to graduate from engineering officer (cadet) programs than deck officer programs.

Other Information

Of the five participating colleges that offer deck and engineering programs, only two indicated they were planning to offer new programs in the next five years. One college reported they are planning a short program for deck officers and marine engineering

officers and a continuing education program. The other college identified a number of short programs ranging from three days to five months duration.

The three most commonly used student recruitment strategies identified by the colleges participating in the study are:

- School visits and career fairs;
- Newspapers;
- Media; and
- College Website.

Other student recruitment strategies identified included, in no particular order:

- Job shadowing;
- Student Ambassador;
- Mailouts;
- Guidance Counsellor;
- Brochures;
- Word of mouth;
- Promotional video and cd; and
- Maritime exhibitions.

Other studies conducted in Canada comment on the difficulty colleges/institutes experience in attracting students to marine engineering and navigation programs.[34] Recruitment for marine occupations is a concern in the OECD countries.[35]

6.0 Factors Affecting Current and Projected Marine Personnel Demand and Supply in Eastern Canada

The most frequently identified factors affecting current and future demand and supply of marine personnel in Eastern Canada, were concurrent major projects and growth of the offshore oil and gas industry.

Other factors which impact the demand and supply of marine personnel are:

- Volume of bulk transport;
- National Transportation policy regarding investment and crewing requirements for the marine transport industry;
- Lower wages for foreign seafarers;
- Lack of a national strategy to encourage young people to consider marine careers balanced with the fact the number of vessels in the Canadian fleet is declining;
- Decrease in the size of the Canadian fleet;
- Cyclical nature of work (e.g., downturn in seismic work in 2003);
- Federal and provincial governments decisions regarding acquisition or repair of fleet, and outsourcing ferry services, the decline of the Federal fleet;
- Industry specific requirements;
- Industry leave systems;
- Availability of college seats; and
- Overseas participating employers attracting Canadian seafarers through income tax reduction incentives.

---

34 *Making Waves – A Profile of Career Opportunities in Niagara's Marine Sector*, 2000, (p. 32).
35 *BIMCO/ISF 2000 – Manpower Update - The Worldwide Demand for and Supply of Seafarers*, 2000, (p.3).

Other studies point to the public image of the maritime sector as a factor affecting recruitment of youth to the marine industry. "The public image of the maritime sector is a key element of concern for industry representatives. The marine mode boasts a superior environmental record in comparison with other modes, a consistently declining accident rate, and a potentially positive impact on societal costs related to road maintenance, congestion and vehicular accidents. It also offers salary conditions that are among the best in the marketplace and numerous opportunities for high quality employment. Despite all of these positive factors, the public profile of the industry continues to be low and fairly negative. This attitude is true not only among the general public, but just as importantly, among the clientele of youths whom the industry is seeking to interest in a career."[36]

The factors which impact the demand and supply of marine personnel by participants from the marine fabrication and repair sector included:

- Absence of a national transportation policy for Canada and a long term vision for the industry;
- Concurrent projects, particularly for fabricators engaged in offshore oil and gas projects. The project-orientation of the industry means the facilities ramp up and ramp down resources as required, making it difficult to establish a stable core operation;
- Cyclical nature of the work; and
- Lack of qualified yard workers to replace aging shipyard workers.

7.0 Salary Estimates for At-Sea and Shore-Based Occupations

Twenty-seven participating employers provided salary information identifying the low and high salary for each at-sea and shore-based occupation. In cases where the survey participant only included one salary (i.e., not a low and high salary) the salary was recorded as the low and high salary for the occupation. Table 19 lists the average low and high salary, and minimum and maximum salary per occupation.

Category	Occupation	Salary			
		Average Low Range	Average High Range	Minimum	Maximum
At-Sea Occupations					
Deck Officers	Master Mariner	$ 95,077	$ 106,305	$ 75,000	$ 150,000
	Master, Intermediate Voyage	79,947	85,127	54,000	125,000
	First Mate, Intermediate Voyage	66,825	74,125	46,000	110,000
	Command Endorsement, 350 tonne	60,508	69,648	38,649	86,400
	Watchkeeping Mate, Unrestricted	48,960	53,913	28,800	85,000
	Watchkeeping Mate, Restricted	49,817	57,100	40,000	75,000
	Deck Officer (licensed) Back-up positions	75,000	75,000	75,000	75,000
	Deck Officer Cadets (part year)	12,000	14,400	12,000	14,400
	Master Local Voyage	87,500	110,000	75,000	110,000
	First Mate Local Voyage	76,667	85,000	60,000	90,000

[36] Executive Summary of Sectoral Profile - "Let's Not Miss the Boat", June 2002, (p. 12).

Category	Occupation	Salary			
		Average Low Range	Average High Range	Minimum	Maximum
	Other	42,000	42,000	42,000	42,000
Engineering Officers	First Class Marine Engineer	90,685	101,092	71,000	150,000
	Second Class Marine Engineer	74,882	80,729	51,000	109,000
	Third Class Marine Engineer	58,963	64,556	42,700	90,000
	Fourth Class Marine Engineer	51,693	57,238	35,000	80,000
	Marine Officer Back-up positions	71,500	77,000	63,000	80,000
	Marine Officer Cadets (part year)	12,000	14,400	12,000	14,400
	Other	41,000	62,500	40,000	75,000
Catering	Cook	46,182	51,271	30,000	75,000
	Caterer	33,404	35,800	26,200	43,000
	Porters	41,000	48,500	35,000	50,000
	Chief Steward	46,800	53,000	44,000	60,000
	Catering Personnel Back-up Positions	35,000	39,000	35,000	39,000
Unlicensed Marine Personnel	Bridge Watch Rating (Deckhand)	40,891	46,603	28,038	62,000
	Engine Watch Rating (Engine Room Asst)	41,644	43,978	30,000	60,000
	Back-up Ratings	50,000	50,000	50,000	50,000
	Bridge Watch Rating (Able Seaman)	46,000	58,500	40,000	65,000
Shipboard Administration	Ships Clerk	40,180	45,180	35,360	55,000
	Purser	43,453	44,453	35,360	50,000
	Other	51,000	58,000	51,000	58,000
Specialized Operational Personnel	Marine Crane Operator	62,667	70,333	55,000	79,000
Maintenance	Marine Electrical Technician	57,988	66,363	35,000	100,000
	Marine Electronics Technician	68,667	85,000	60,000	100,000
	Instrumentation Technician	56,000	73,333	40,000	85,000
	Marine Rigger	40,500	48,500	37,000	53,000
	Marine Welder-Plater	50,000	55,250	37,000	67,000
	Motorman-Oiler	37,050	48,568	29,100	65,000
	Other	54,286	61,030	27,144	80,000
	Production Technician	-	-	-	-
Communications	Radio Operator	56,000	70,333	52,000	85,000
Shore-Based Occupations					
Administration	Marine Superintendent-Operations Manager	87,222	99,444	65,000	150,000

Category	Occupation	Salary			
		Average Low Range	Average High Range	Minimum	Maximum
	Safety Manager	64,375	71,250	40,000	100,000
	Logistics Scheduling	48,857	57,857	30,000	75,000
	Other	60,000	85,833	35,000	130,000
Design Personnel	Naval Architect	43,000	78,000	30,000	90,000
	Naval Architectural Design Technologist	48,200	64,600	30,000	75,000
	Marine Engineering Design Technologist	55,486	67,200	30,000	84,000
	Draftsperson-CADD Operator	37,714	56,571	30,000	75,000
	Engineering Technologist	44,500	67,500	30,000	80,000

Table 19 – Salary Information for Marine and Marine Related Occupations

For purposes of comparison, Census 2001 information indicates that the average employment income for all earners (all industries) working full-year, full time[37] in Canada was $43,298.[38] The majority of occupations identified in Table 16, (i.e. marine related occupations), exceed the Canadian average employment income.

Table 20 presents the average employment income for all earners working full time, full-year for each of the provinces in Eastern Canada.

Province	Average Employment Income (all earners working full time, full-year)
Newfoundland and Labrador	$37,910
Nova Scotia	$37,872
New Brunswick	$36,094
Prince Edward Island	$34,135
Quebec	$39,217
Ontario	$47,299

Table 20 – Average Employment Income by Province[39]

"The salaries paid within the industry are generally superior to those that are paid to employees with the same level of training in other sectors. Moreover, given the nature of the shipping business, navigating personnel are asked to do overtime work on a fairly regular basis."[40]

37 Defined as working 49-52 weeks in the reference year, mostly full time

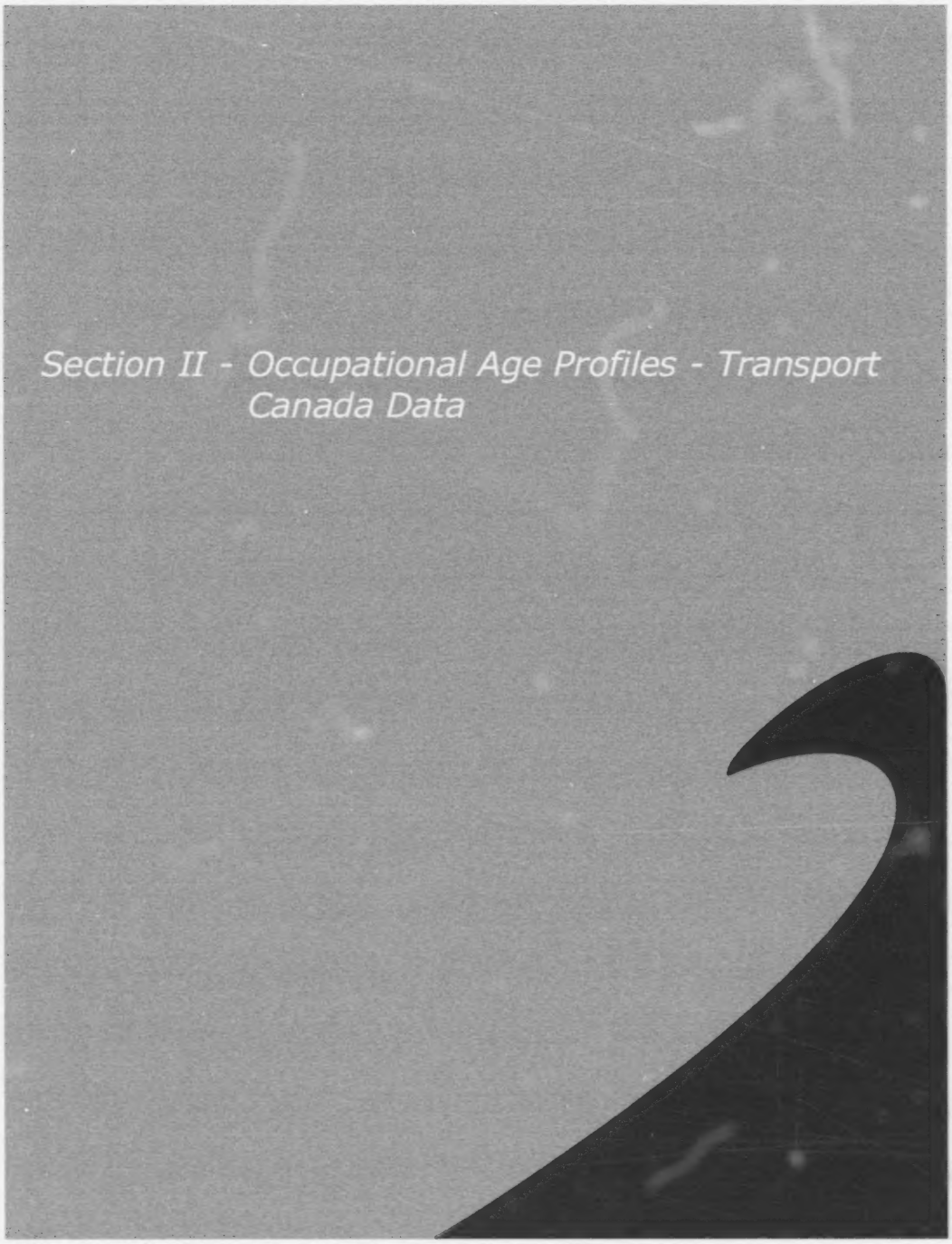
38 Statistics Canada's report *Number and Average Employment Income (2) in Constant 2000 Dollars, Sex (3), Work Activity (3) and Occupation – 1991 Standard Occupational Classification (Historical) (707A) for Population 15 Years and Over With Employment Income for Canada, Provinces, Territories and Census Metropolitan Areas, 1995 and 2000 – 20% Sample Data.* This Report uses data from 2001 Census.

39 Ibid.

40 Executive Summary of Sectoral Profile – "Let's Not Miss the Boat", June 2002, (p. 8).

In the Niagara region, "wages [in the marine transportation sector] are 60% higher than the regional average."[41]

41 *Making Waves - A Profile of Career Opportunities in Niagara's Marine Sector*, July 2000, Foreward, p. v.


Section II - Occupational Age Profiles - Transport Canada Data

Section II – Occupational Age Profiles - Transport Canada Data

8.0 Occupational Age Profiles - Transport Canada Data

Transport Canada participated in this study, providing the number of marine certificates holders in Canada and Eastern Canada. This is a separate data set from the employment data provided by the employers participating in the survey, for which the analysis was presented in Section I – Employment Survey Results. The Transport Canada data does not indicate whether or not the certificate holders are employed.

Comparison of the Transport Canada data and the survey data indicates similar findings in these areas:

- A similar age profile for engineering officers;
- The largest cohort of engineering officers is 41 to 50 years of age; and
- Engineering officers is an older group than deck officers.

The analysis of the Transport Canada data supports the survey results regarding engineering officer certificates.

While there were differences in some of the results for specific deck officer certificates in the survey and the Transport Canada data, overall there were sufficient similarities to support the study recommendations regarding marine officer certificates.

8.1 Canadian Seafarers - STCW Certification

The IMO Convention on Standards of Training, Certification and Watchkeeping 1978 (STCW), which regulates international training and certification standards in the industry, was amended in 1995 with "the objective of upgrading the overall standard of competence of seafarers employed in the world fleet."[42]

The *Canada Shipping Act* which regulates the certification of officers and other ship personnel, is administered by Transport Canada's Marine Safety Branch.

Transport Canada participated in the MCS study, providing the number of individuals with marine certificates. In Canada, the implementation of STCW required seafarers to apply for the STCW certificate. Transport Canada's database of mariners with STCW certificates is believed to provide a reasonably accurate view of valid certificate holders. Transport Canada officials reviewed each individual's record to determine highest certificate held and age category, based on a database query on December 30, 2003.

The numbers do not include certificate holders who did not possess a valid STCW 95 endorsement. Many seafarers working in Canada possess certificates that are accompanied by Continued Proficiency (CP) Endorsements. Such certificates are valid only for use within Canada and on certain voyages between Canada and the US. The holders of certificates with CP Endorsements and not STCW95 endorsements are not included.

---

[42] *BIMCO/ISF 2000 Manpower Update, The Worldwide Demand for and Supply of Seafarers*, Main Report, April 2000, (p. 4).

8.2 Age Profile of Deck Officers

Of the 2013 deck officer certificate holders reported in Eastern Canada by Transport Canada, 18% (367) were under 30 years of age, 27% (536) were 30 to 40 years of age, 35% (705) were 41 to 50 years of age, 10% (208) were 51 to 55 years of age and 10% (197) were more than 55 years of age. The age profile for deck officer certificate holders reported in Eastern Canada by Transport Canada is presented in Figure 20.

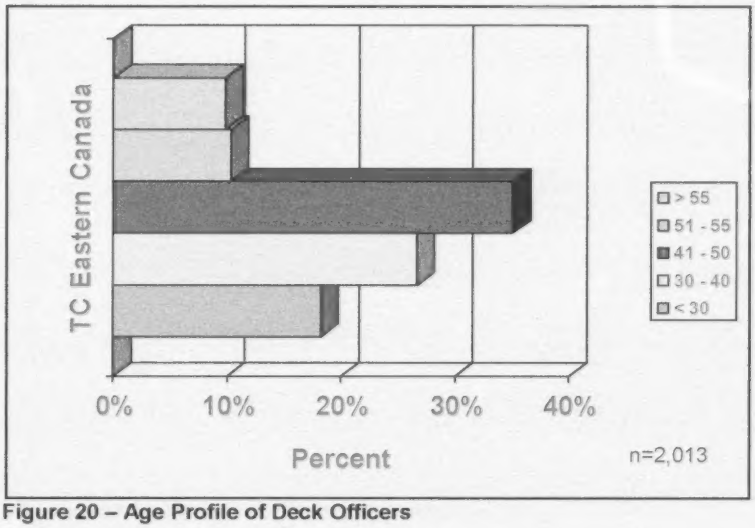


Figure 20 – Age Profile of Deck Officers

Watchkeeping Mate, Unrestricted

Of the 313 *Watchkeeping Mate, Unrestricted* certificate holders reported in Eastern Canada by Transport Canada, 59% (185) were under 30 years of age, 22% (69) were 30 to 40 years of age, 14% (45) were 41 to 50 years of age, 3% (8) were 51 to 55 years of age, and 2% (6) were more than 55 years of age. The age profile for *Watchkeeping Mate, Unrestricted* certificate holders is presented in Figure 21.

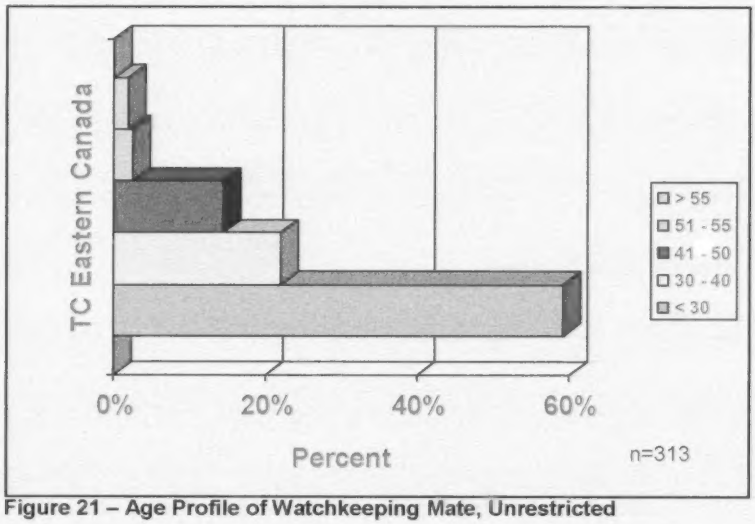


Figure 21 – Age Profile of Watchkeeping Mate, Unrestricted

Mate, Intermediate Voyage

Of the 356 *Mate, Intermediate Voyage* certificate holders reported in Eastern Canada by Transport Canada, 30% (107) were under 30 years of age, 35% (124) were 30 to 40 years of age, 26% (94) were 41 to 50 years of age, 6% (22) were 51 to 55 years of age and 3% (9) were more than 55 years of age. Figure 22 illustrates the age profile of *Mate, Intermediate Voyage* certificate holders.

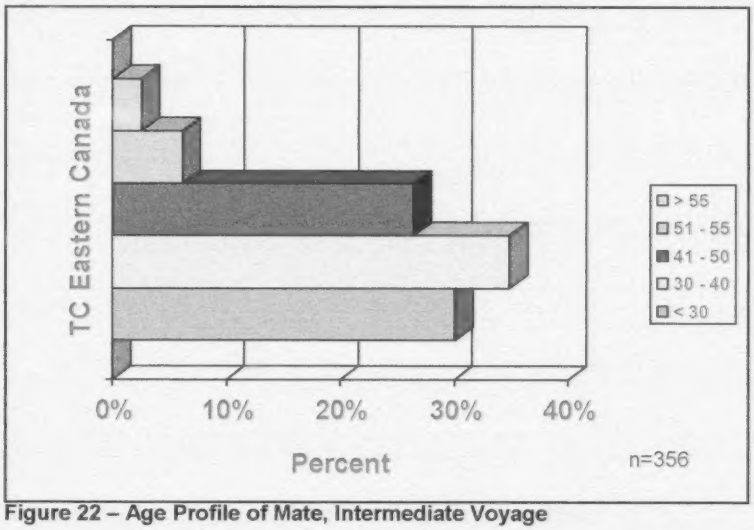


Figure 22 – Age Profile of Mate, Intermediate Voyage

Transport Canada indicates the largest group of *Mate, Intermediate Voyage* certificate holders were 30 to 40 years age.

Transport Canada identified a group who hold both *Mate, Intermediate Voyage* and *Master Local Voyage* certificates. These individuals may work in positions requiring either certificate and it is unknown which certificate these individuals are using in their employment. To determine the

impact of this group of certificate holders, all the individuals were assumed to be working as *Mate, Intermediate Voyage*. The effect on the *Mate, Intermediate Voyage* age profile, was to bring the age categories of under 30 years of age, 30 to 40 and 41 to 50 years of age closer together, being 28%, 33% and 29%, respectively.

Taking the alternate position, assuming this group is working in a position requiring a *Master Local Voyage* certificate, increases the proportion of the group of 41 to 50 years of age and reduces the relative proportion of the 51 to 55 years of age group.

Master Intermediate Voyage

Of the 250 *Master Intermediate Voyage* certificate holders reported in Eastern Canada by Transport Canada, 13% (32) were under 30 years of age, 41% (102) were 30 to 40 years of age, 34% (85) were 41 to 50 years of age, 6% (15) were 51 to 55 years of age, and 6% (16) were more than 55 years of age. Figure 23 illustrates the age profile of *Master Intermediate Voyage* certificate holders.

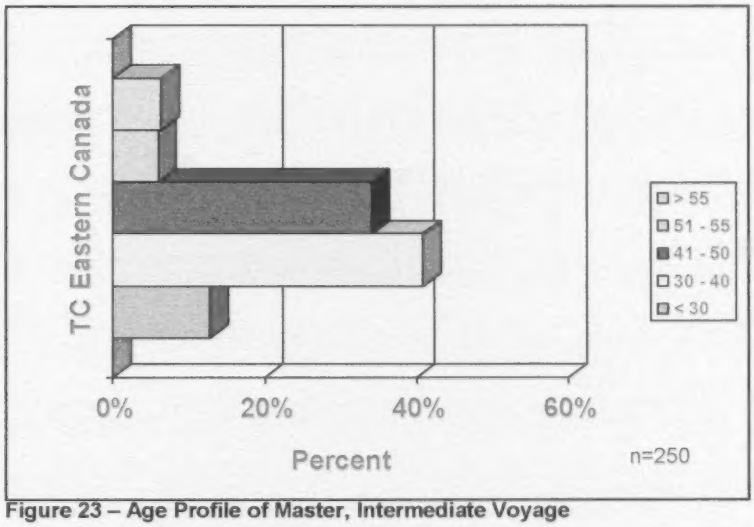


Figure 23 – Age Profile of Master, Intermediate Voyage

The largest group of *Master Intermediate Voyage* certificate holders was 30 to 40 years of age. There were 23 *Master Intermediate Voyage* certificate holders 51 to 55 years of age reported by Transport Canada for Canada.

In the category more than 55 years of age, Transport Canada for Eastern Canada reported 16 *Master Intermediate Voyage* certificate holders.

Master Mariner

Of the 648 *Master Mariner* certificate holders reported in Eastern Canada by Transport Canada, 0.6% (4) were under 30 years of age, 20% (129) were 30 to 40 years of age, 45% (294) were 41 to 50 years of age, 15% (96) were 51 to 55 years of age, and 19% (125) were more than 55 years of age. Figure 24 illustrates the age profile of *Master Mariner* certificate holders.

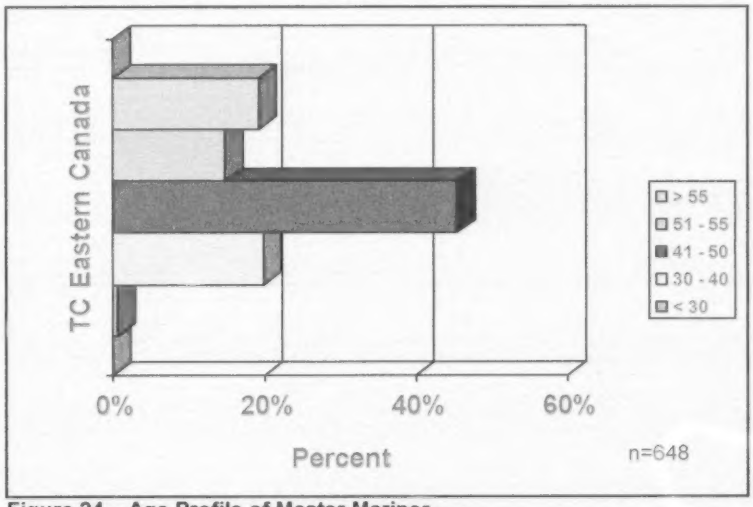


Figure 24 – Age Profile of Master Mariner

The number of *Master Mariner* certificate holders under 30 years of age is very low, four. This is an expected result due to the time required to achieve the proceeding marine certificates.

The largest group of *Master Mariner* certificate holders are 41 to 50 years of age.

Nineteen percent of *Master Mariner* certificate holders are more than 55 years of age.

Mate Local Voyage

Of the 36 *Mate Local Voyage* certificate holders reported in Eastern Canada by Transport Canada, 11% (4) were under 30 years of age, 25% (9) were 30 to 40 years of age, 42% (15) were 41 to 50 years of age, 14% (5) were 51 to 55 years of age and 8% (3) were more than 55 years of age. Figure 25 illustrates the age profile of *Mate Local Voyage* certificate holders.

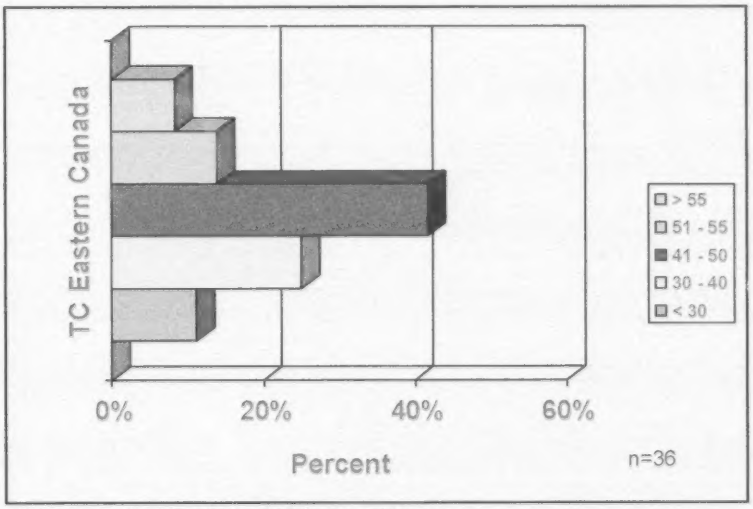


Figure 25 – Age Profile of Mate Local Voyage

Master Local Voyage

Of the 126 *Master Local Voyage* certificate holders reported in Eastern Canada by Transport Canada, 9% (11) were under 30 years of age, 17% (22) were 30 to 40 years of age, 37% (47) were 41 to 50 years of age, 23% (29) were 51 to 55 years of age and 13% (17) were more than 55 years of age. Figure 26 illustrates the age profile of *Master Local Voyage* certificate holders.

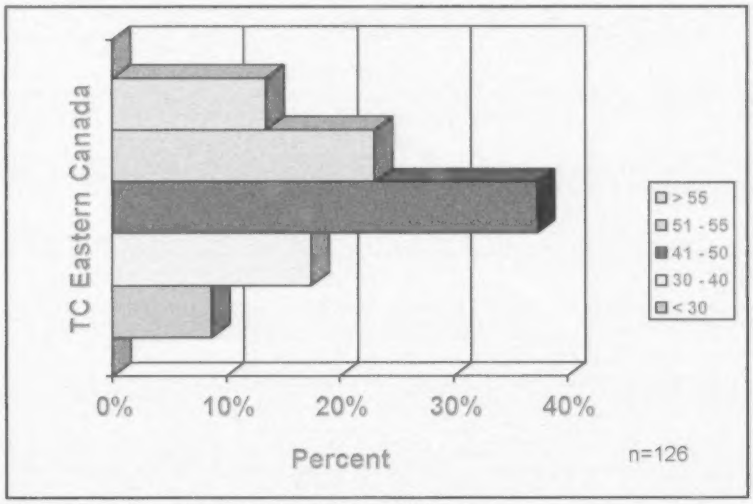


Figure 26 – Age Profile of Master Local Voyage

Watchkeeping Mate Restricted

Of the 181 *Watchkeeping Mate Restricted* certificate holders reported in Eastern Canada by Transport Canada, 16% (29) were under 30 years of age, 29% (53) were 30 to 40 years of age, 37% (67) were 41 to 50 years of age, 11% (20) were 51 to 55 years of age and 7% (12) were more than 55 years of age. Figure 27 illustrates the age profile of *Watchkeeping Mate Restricted* certificate holders.

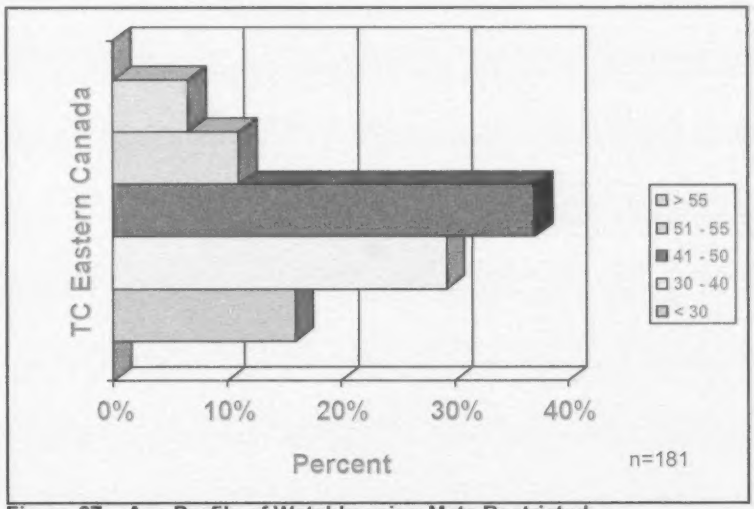


Figure 27 – Age Profile of Watchkeeping Mate Restricted

Master, 350 Tonne

Of the 61 *Master 350 Tonne* certificate holders reported in Eastern Canada by Transport Canada, none were under 30 years of age, 26% (16) were 30 to 40 years of age, 56% (34) were 41 to 50 years of age, 11% (7) were 51 to 55 years of age and 7% (4) were more than 55 years of age. Figure 28 illustrates the age profile of *Master 350 Tonne* certificate holders.

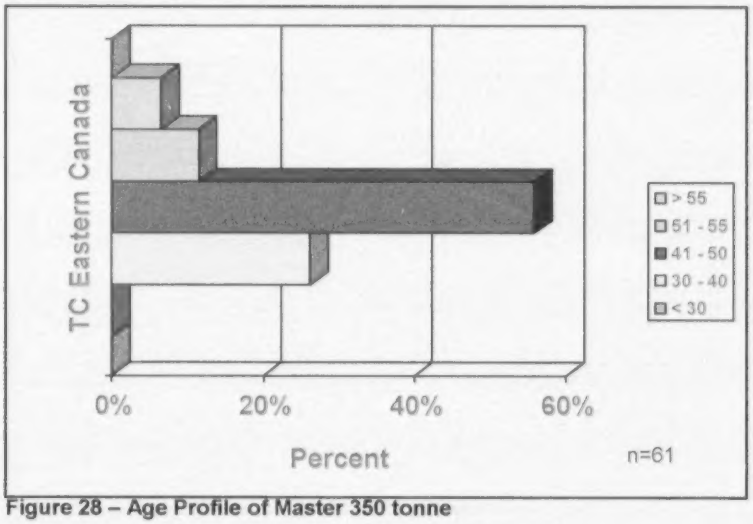


Figure 28 – Age Profile of Master 350 tonne

8.3 Age Profile of Engineering Officers

Of the 2605 engineering officer certificate holders reported in Eastern Canada by Transport Canada, 9% (246) were under 30 years of age, 19% (500) were 30 to 40 years of age, 37% (968) were 41 to 50 years of age, 13% (348) were 51 to 55 years of age, and 21% (543) were more than 55 years of age. Figure 29 illustrates the age profile of engineering officers.

The largest cohort in the engineering officers was 41 to 50 years of age.

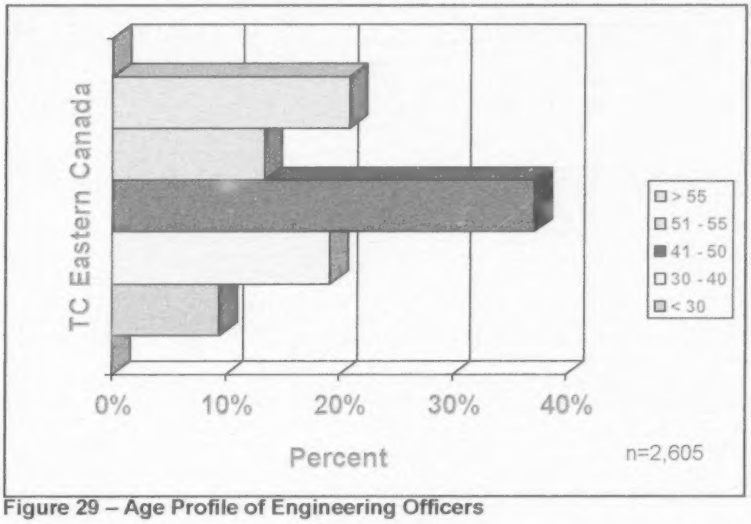


Figure 29 – Age Profile of Engineering Officers

Figure 30 illustrates the comparison of age profiles of deck and engineering officers. Comparing the overall age profile of deck officers with engineering officers:

- Engineering officer certificate holders, were an older group than the deck officers;
- There was a smaller percentage of young engineering officers (under 30 years of age and 30 to 40 years of age); and
- The percentage of engineering officers more than 55 years of age was 21%.

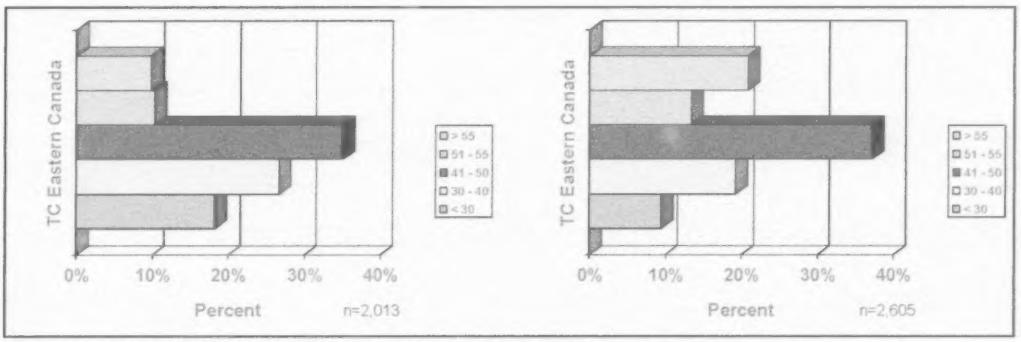


Figure 30 – Comparison of Age Profiles for Deck and Engineering Officers

Fourth Class Marine Engineer

Of the 885 *Fourth Class Marine Engineer* reported in Eastern Canada by Transport Canada, 19% (167) were under 30 years of age, 20% (175) were 30 to 40 years of age, 33% (290) were 41 to 50 years of age, 13% (115) were 51 to 55 years of age, and 16% (138) were more than 55 years of age. Figure 31 illustrates the age profile of *Fourth Class Marine Engineer* certificate holders.

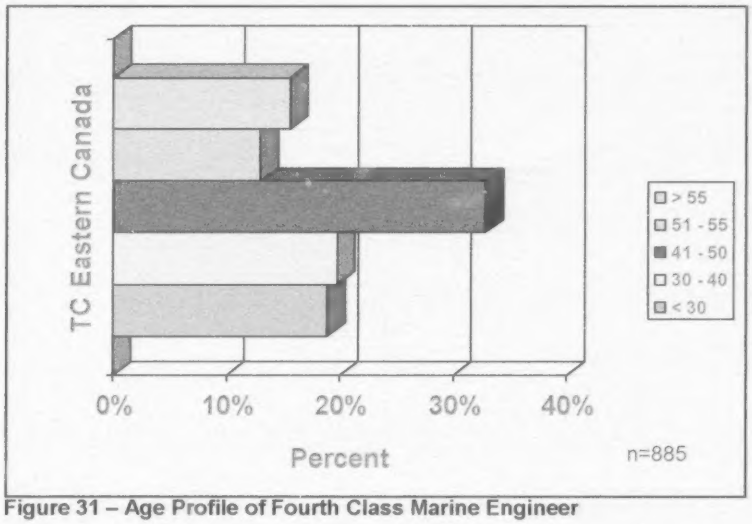


Figure 31 – Age Profile of Fourth Class Marine Engineer

More than 29% of *Fourth Class Marine Engineer* certificate holders were more than 50 years of age.

Third Class Marine Engineer

Of 718 *Third Class Marine Engineer* certificate holders reported in Eastern Canada by Transport Canada, 7% (47) were under 30 years of age, 16% (116) were 30 to 40 years of age, 37% (266) were 41 to 50 years of age, 15% (107) were 50 to 55 years of age, and 25% (182) were more than 55 years of age. Figure 32 illustrates the age profile of *Third Class Marine Engineer* certificate holders.

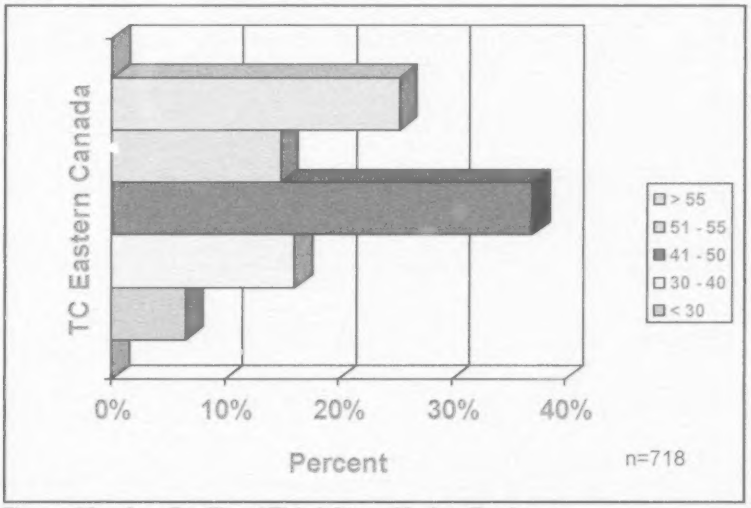


Figure 32 – Age Profile of Third Class Marine Engineer

The Transport Canada data indicates almost 75% of the *Third Class Marine Engineer* certificate holders were older than 41 years of age.

Second Class Marine Engineer

Of the 521 *Second Class Marine Engineer* certificate holders reported in Eastern Canada by Transport Canada, 6% (30) were under 30 years of age, 28% (144) were 30 to 40 years of age, 36% (186) were 41 to 50 years of age, 12% (63) were 51 to 55 years of age, and 19% (98) were more than 55 years of age. Figure 33 illustrates the age profile of *Second Class Marine Engineer* certificate holders.

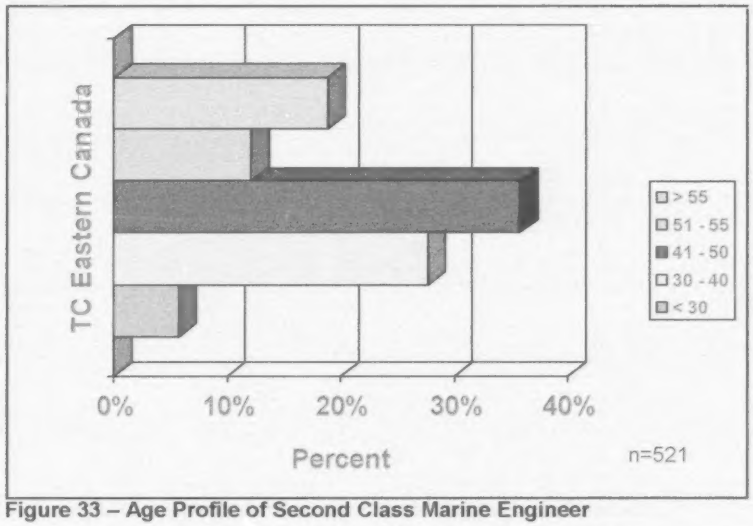


Figure 33 – Age Profile of Second Class Marine Engineer

First Class Marine Engineer

Of the 481 *First Class Marine Engineer* certificate holders reported in Eastern Canada by Transport Canada, 0.4% (2) were under 30 years of age, 14% (65) were 30 to 40 years of age, 47% (226) were 40 to 50 years of age, 13% (63) were 50 to 55 years of age and 26% (125) were more than 55 years of age. Figure 34 illustrates the age profile of *First Class Marine Engineer* certificate holders.

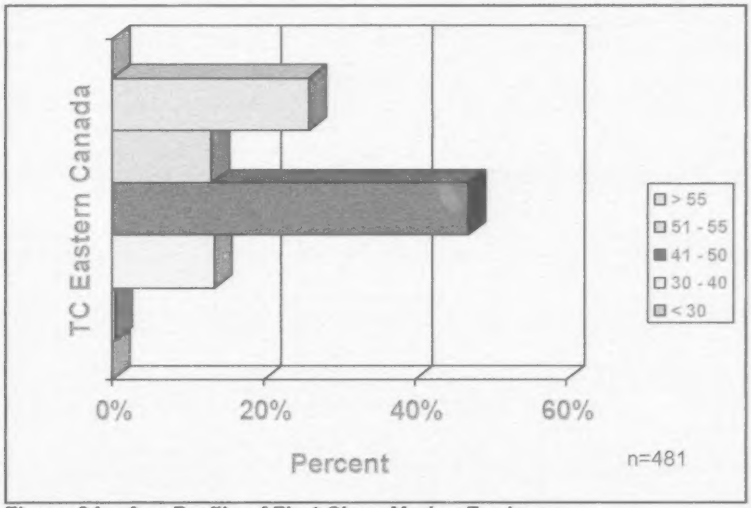


Figure 34 – Age Profile of First Class Marine Engineer

Figure 34 illustrates that the largest group was 41 to 50 years of age.

8.4 Transport Canada - Deck Officer Certificate Holders

The potential impact of retirement on each of the three career paths for deck officers is presented in Tables 21, 22 and 23, using the number of deck officer certificates held across Canada and in Eastern Canada. It should be noted that the deck officer certificates reported for Eastern Canada are a subset of the total number of deck officer certificates for Canada.

Marine Certificate	2003	Reaching age 65 by 2008	Reaching age 65 by 2013	Potential Replacement Requirement in Next 10 years	% Replacement in Next 10 Years
Master Mariner (Canada)	824	112	96	208	25%
Master Mariner (Eastern Canada)	648	56	69	125	19%
Master, Intermediate Voyage (Canada)	315	15	15	30	9.5%
Master, Intermediate Voyage (Eastern Canada)	250	8	8	16	6.4%
First Mate, Intermediate Voyage (Canada)	458	2	12	14	3.1%
First Mate, Intermediate Voyage (Eastern Canada)	356	2	7	9	2.5%
Watchkeeping Mate, Unrestricted (Canada)	382	2	5	7	1.8%
Watchkeeping Mate, Unrestricted (Eastern Canada)	313	2	4	6	1.9%

Table 21 -- Marine Certificate Holders Reaching Age 65 by 2008 and 2013 Transport Canada Data for Canada and Eastern Canada – Master Mariner Career Path

As illustrated in Table 21, a substantial number of retirements of *Master Mariner* certificate holders are likely to occur over the next five to ten years. This will strain the prerequisite position *Master, Intermediate Voyage* certificate holders as the current population holding this certificate is significantly smaller, only 38% of the number of *Master Mariner* certificate holders. If individuals in this group are not interested in preparing for the *Master Mariner* certificate, there is potential for a bottleneck in filling the positions requiring *Master Mariner* certificates. This analysis deals with replacement, assuming there is no reduction in the size of the industry/fleet, and does not address

additional personnel required to address any growth in demand. These are conservative assumptions.

As expected, in the entry-level marine certificates for deck officer, few are expected to retire.

One of the issues in gaining a *Master Mariner* certificate is limited access to deep-water experience. "In the marine sector, individuals must acquire sea time experience to progress through the levels of marine competency certification. Two issues were identified with regard to acquiring sea time experience. Senior level positions require deep-sea experience. For example, to progress from a Master Intermediate Voyage certificate to a Master Mariner certificate requires 12 months deep-sea experience, which cannot be acquired locally. (Master Mariner qualification is an international standard.) Also, at this time, experience on floating production, storage and offloading (FPSO) vessels is not recognized as accredited sea time."[43]

It should be noted that the *Watchkeeping Mate, Unrestricted* certificate is the fundamental certificate for a career leading to a *Master Local Voyage* or a *Master Mariner* certificate.

Certificate	2003	Reaching age 65 by 2008	Reaching age 65 by 2013	Replacement in Next 10 years	% Replacement in Next 10 Years
Master Local Voyage & Mate Intermediate (Canada)	70	6	9	15	21%
Master Local Voyage & Mate Intermediate (Eastern Canada)	53	2	3	5	9%
Master, Local Voyage (Canada)	221	15	26	41	19%
Master, Local Voyage (Eastern Canada)	115	9	8	17	15%
First Mate, Local Voyage (Canada)	61	0	4	4	7%
First Mate, Local Voyage (Eastern Canada)	36	0	3	3	8%
Watchkeeping Mate,	Same as				

[43] Stakeholder Forum and Working Session Report, May 29, 2003, Presentation and Discussion of the Study "*Labour Market Assessment of the Offshore Oil and Gas Industry Supply and Service Sector in Newfoundland and Labrador*", Petroleum Industry Human Resources Committee (PIHRC), (p. 12).

Certificate	2003	Reaching age 65 by 2008	Reaching age 65 by 2013	Replacement in Next 10 years	% Replacement in Next 10 Years
Unrestricted (Canada)	Table 18				
Watchkeeping Mate, Unrestricted (Eastern Canada)	Same as Table 18				

Table 22 – Marine Certificate Holders Reaching Age 65 by 2008 and 2013 Transport Canada Data for Canada and Eastern Canada – Master Local Voyage Career Path

The career path leading to a *Master, Local Voyage* certificate indicates a small number of individuals with the prerequisite certificate, *First Mate Local Voyage*. If there are individuals in this pool who are not pursuing the *Master, Local Voyage* certificate, then there is the possibility of a bottleneck occurring. There is a group of individuals holding dual certificates, namely *Master Local Voyage* and *Mate Intermediate*, which may mitigate this situation. Which certificate the individuals with dual certificates are using in their current employment is unknown.

Certificate	2003	Reaching age 65 by 2008	Reaching age 65 by 2013	Replacement in Next 10 Years	% Replacement in Next 10 Years
Master 350 tonne (Canada)	130	2	7	9	7%
Master 350 tonne (Eastern Canada)	61	9	8	17	28%
Watchkeeping Mate, Restricted (Canada)	354	0	4	4	1%
Watchkeeping Mate, Restricted (Eastern Canada)	181	3	9	12	7%

Table 23 – Marine Certificate Holders Reaching Age 65 by 2008 and 2013 Transport Canada Data for Canada and Eastern Canada – Master 350 Tonne Career Path

The forecast volume of retirement of *Master 350 tonne* certificate holders is not significant, and replacement should not be an issue.

Certificate	2003	Reaching age 65 by 2008	Reaching age 65 by 2013	Replacement in Next 10 Years	% Replacement in Next 10 Years
Total Deck Officers (Canada)	2815	154 (46%)	178 (54%)	332	12%
Total Deck Officers (Eastern Canada)	2013	91 (43%)	119 (57%)	210	10%

Table 24 – Total Deck Officer Replacement - Transport Canada Data for Canada and Eastern Canada

Summary of Findings

- As presented in Table 24, 12% (332) of deck officers in Canada, as reported by Transport Canada, will reach age 65 by 2013. Of the 2013 total deck officers in Eastern Canada as reported by Transport Canada, 10% will reach age 65 by 2013;
- A high percentage of replacement is expected at the senior deck officer certificates for each of the career paths, namely *Master Mariner*, *Master Local Voyage*, *Master 350 Tonne*; and
- A greater percentage of total certificate holders reaching age 65 will occur in the period 2009 to 2013.

8.5 Transport Canada - Engineering Officer Certificate Holders

The impact of retirement on the career path for engineering officer is examined in Table 25, using the number of engineering officer certificates held across Canada and in Eastern Canada.

Certificate	2003	Reaching age 65 by 2008	Reaching age 65 by 2013	Replacement in Next 10 years	% Replacement in Next 10 Years of Total Certificate Population in 2003
First Class Marine Engineer (Canada)	724	81 (44%)	104 (56%)	185	26%
First Class Marine Engineer (Eastern Canada)	481	58 (46%)	67 (53%)	125	26%
Second Class Marine Engineer (Canada)	775	64 (39%)	99 (61%)	163	21%
Second Class Marine Engineer (Eastern Canada)	521	37 (38%)	61 (62%)	98	19%

Certificate	2003	Reaching age 65 by 2008	Reaching age 65 by 2013	Replacement in Next 10 years	% Replacement in Next 10 Years of Total Certificate Population in 2003
Third Class Marine Engineer (Canada)	972	125 (46%)	147 (54%)	272	28%
Third Class Marine Engineer (Eastern Canada)	718	83 (46%)	99 (54%)	182	25%
Fourth Class Marine Engineer (Canada)	1270	66 (34%)	128 (66%)	194	15%
Fourth Class Marine Engineer (Eastern Canada)	885	49 (36%)	89 (65%)	138	16%
Total Marine Engineers (Canada)	3741	336 (41%)	478 (59%)	814	22%
Total Marine Engineers (Eastern Canada)	2605	227 (42%)	316 (58%)	543	21%

Table 25 – Transport Canada – Marine Engineers Reaching Age 65 by 2008 and 2013

First Class Marine Engineer

Twenty-six percent (185) of *First Class Marine Engineer* certificate holders will reach 65 years of age within the next 10 years. Of these, 68% (125) reside in Eastern Canada.

The number of certificate holders who will reach age 65 by 2013 is higher than those who will reach age 65 by 2008.

Second Class Marine Engineer

Twenty-one percent (163) of *Second Class Marine Engineer* certificate holders in Canada will reach 65 years of age within the next 10 years. Of these, 60% (98) reside in Eastern Canada.

Third Class Marine Engineer

Twenty-eight percent (272) of *Third Class Marine Engineer* certificate holders will reach 65 years of age within the next 10 years. Of these 272, 182 reside in Eastern Canada. Approximately the same proportion of *Third Class Marine Engineer* certificate holders will reach 65 years of age within 10 years in Eastern Canada as Canada, 25% and 28% respectively. Given that *Third Class Marine Engineer* is the second step on the career path, this is a high percentage of individuals in that class reaching 65 years of age in this timeframe.

Fourth Class Marine Engineer

Fifteen percent (194) of *Fourth Class Marine Engineer* certificate holders will reach 65 years of age within the next 10 years and 71% (138) of these reside in Eastern Canada. This is not unexpected, since 70% of *Fourth Class Marine Engineer* certificate holders reside in Eastern Canada, so the proportion of reaching age 65 is similar. Approximately one-third of the retirements will occur by 2008 and the remaining two-thirds by 2013. This breakdown is the same for Canada and Eastern Canada.

Summary of Findings

- Of the total marine engineers in Canada holding Transport Canada certificates, 22% (814) will reach age 65 within the next 10 years. Of the total marine engineers in Eastern Canada, a subset of the marine engineers holding Transport Canada certificates, 21% (543) will reach age 65 within the next 10 years;
- As presented in Table 25, there is a high percentage of replacement anticipated in the next 10 years in each of the classes of engineering certificates. Thus the combined upward progression through the career path will create opportunities at all certificate class levels; and
- A greater percentage of total certificate holders reaching age 65 will occur in the period 2009 to 2013.

8.6 Resident Province of Nautical and Engineering Certificate Holders

Figure 35 presents the resident province of nautical and engineering certificate holders. The top five provinces are British Columbia, Newfoundland and Labrador, Quebec, Ontario and Nova Scotia, in that order.

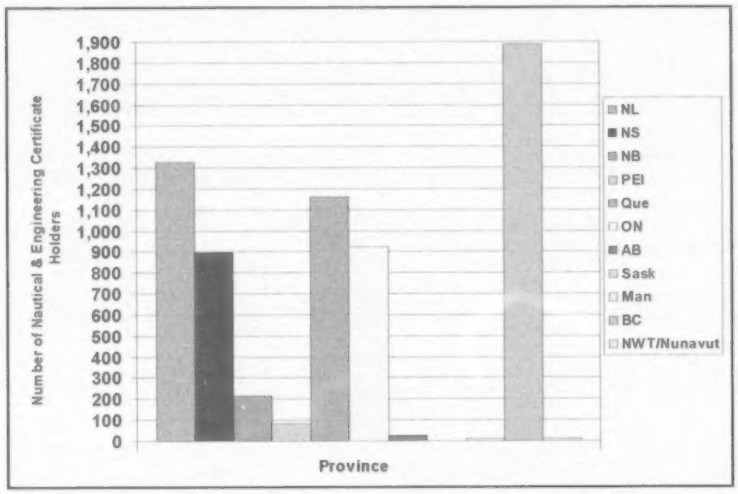


Figure 35 – Resident Province of Nautical & Engineering Certificate Holders

9.0 Environmental Scan

9.1 International – Marine Transportation Industry

The BIMCO/ISF *2000 Manpower Update* report, based on a comprehensive study of supply and demand for seafarers on a global basis, is recognized by the worldwide marine transportation industry. BIMCO/ISF reports "the worldwide supply of seafarers in 2000 is estimated to be 404,000 officers and 823,000 ratings…..The worldwide demand for seafarers is 420,000 officers and 599,000 ratings."[44] The shortfall of officers for the world fleet was 16,000 or 4 per cent of the total workforce. While there is a significant surplus supply of ratings, there are "doubts about the extent to which large numbers of these ratings are qualified for international service."[45]

While the shortage of officers is described as "modest", the report notes the obstacles to closing the shortfall raise the significance of the shortage. These obstacles are identified as:

- **Cultural and language differences;**
- **Lack of international experience; and**
- **Nationality restrictions that apply to many flags.**[46]

These obstacles prevent surplus seafarers of some nationalities from filling the shortfall of other countries.[47]

The report forecasts the shortage of officers will increase to 46,000 by 2010 "unless training is increased or measures are taken to address the rate at which seafarers leave the industry."[48]

The *BIMCO/ISF 2000 Manpower Update* reports increased levels of recruitment and training, "with officer trainees comprising 1 in 10 officers compared to 1 in 13 in 1995….., with a particularly substantial increase in trainees recruited from OECD countries. However, the *Update* indicates that recruitment levels still need to increase further to meet anticipated additional demand for qualified officers. Specifically, the Update recommends that officer recruitment and training levels need to increase from 1 in 10 to 1 in 7, which equates to approximately 1.5 trainees per ship. This target will clearly represent a major challenge."[49]

Increased future demand for seafarers is expected. "There is little scope for further manning reductions if account is taken of the impact of international regulations such as working time legislation, and because back-up requirements may well need to increase to accommodate additional training or increased leave. Therefore, even a modest future increase in the number of ships in the world fleet will result in additional demand for seafarers which can only be accommodated if recruitment and training are increased (unless wastage is reduced)."[50]

---

44 *BIMCO/ISF 2000 Manpower Update, The Worldwide Demand for and Supply of Seafarers*, Summary Report, April 2000, (p. 1).
45 Ibid., p. 2.
46 Ibid., p. 2.
47 Ibid., p. 2.
48 Ibid., p. 2.
49 Ibid., p. 3.
50 Ibid., p.3.

While levels of recruitment and training need to increase in future, the other side of this coin is the need to reduce the number of seafarers who leave the industry each year to pursue careers in other industries. This is particularly relevant in the case of officer trainees since the Update indicates around 30 per cent fail to complete their training. This points to the need to improve trainee selection and retention techniques, and to improve perceptions of the industry as a career.[51]

9.2 Canadian Marine Industry

"Canada's marine industry directly employs approximately 18,000 people. Just over two-thirds are employed in the transport segment of the industry, while just under one-third are employed by the shipbuilding and repair industry. Collectively the industry handles over 224 million tons of cargo a year and contributes $2 billion annually to Canada's national revenue.

Although the transportation side of the industry has faced continued decline .... the shipbuilding segment has faced greater descent. Industry sales dropped by half through the 90s and employment plummeted from 12,000 to 5,000. Four of Canada's largest shipyards are located on the east coast, two are on the west coast, and Lake Ontario and Lake Superior each have one."

The two largest shipyards in Canada are St. John Shipbuilding Ltd. and Davi Maritime Inc. St. John Shipbuilding Ltd. ceased operation in April 2000[52], and Davi Maritime Inc. was operating under receivership in December 2003.

The shipbuilding and repair industry has declined significantly since 1990 resulting in significantly lower and more sporadic volumes of production. Numerous factors have contributed to the decline in the industry and the consequent reduction in employment:

- "A declining domestic market;
- Reduced government procurement;
- Worldwide overcapacity"[53]; and
- Subsidization and trade practices of other countries, which have attracted work thereby allowing their industry to improve productivity and cost effectiveness from a continuous volume of work.[54]

A recent study, *A Situational Analysis of Human Resource Issues in the Shipbuilding and Industrial Marine Industry in Canada*, suggests that significant human resource issues facing the Canadian shipbuilding and repair industry are:

- The average age of the workforce in the industry is significantly higher than the average for all Canadian industries and there is a very low proportion of new recruits in the workforce;
- Shortages of managers, professionals and tradespeople already are being experienced in the industry and these shortages are expected to become more acute in the future;
- Improvements in the training system for new entrants to the industry and for the existing workforce are required. The system for training existing workers is particularly problematic.[55]

---

51 Ibid., p.4.

52 *A Long Way Back - A Situational Analysis of Human Resource Issues in the Shipbuilding and Industrial Marine Industry in Canada*, March 31, 2003, Praxis Research and Consulting Inc. for HRP//HRDC Sectoral Partnerships Division, (p. 8).

53 Ibid., p. 1.

54 Ibid., p. 21.

55 Ibid., Executive Summary, p. iv.

This study also comments on the need to consider "redefining the 'industrial marine industry' to include firms such as those that build modules for the offshore".[56]

The impact of this decline on its human resources is significant. " The on-again, off again nature of production made recruiting and retaining workers very difficult for companies who could not offer long-term work to prospective employees. This difficulty was heightened for many of the key professions and trades in the shipbuilding and repair industry because shortages of workers exist in other industries, such as construction and trades contracting, and in the United States. In these circumstances, the shipbuilding and repair industry is at a competitive disadvantage in trying to recruit and retain workers."[57]

10.0 Recommended Steps to Enhance Access to Marine Career Opportunities

Access to marine career opportunities must be enhanced to meet the future marine transportation and offshore oil and gas industries needs in Eastern Canada. A number of steps are recommended to enhance access to marine career opportunities:

i) Initiatives to encourage existing personnel to upgrade skills and promotion of training within the industry;
ii) Promotion of marine careers to increase awareness of career choices for youth, women, aboriginals and others;
iii) Identification of initiatives to encourage industry and, where applicable, unions to increase participation in cadet programs, thereby creating more industry training opportunities for cadets and providing flexibility to increase intake in training programs that incorporate industry work placements;
iv) Increased focus on marine engineering careers;
v) Development of a strategic human resources plan for seafarers in Eastern Canada, in collaboration with Transport Canada and other sectoral committees, including those in Quebec and the Niagara region of Ontario. A number of recent studies indicate there is a need to increase the number of deck and engineering officers, particularly engineering officers. A strategic human resources plan for Eastern Canada should define the demand for deck and engineering officers (in broad terms), identify the issues which impact the labour supply and demand, and identify how these issues will be resolved (i.e, what action will be taken);
vi) Working with industry to find plausible solutions to gaining access to deep sea experience;
vii) Providing professional development opportunities specific to the marine industry for human resource managers;
viii) Extend the analysis of Transport Canada marine certificate holders to include the rest of Canada;
ix) Developing a program, guided by the experience of the *IMO Women In Development Programme* that focuses on areas such as gender awareness training, gender-specific fellowships, leave systems, and on-board accommodation and facilities. It may be necessary to conduct a study to identify and examine in detail why females are underrepresented in marine occupations, and what actions are necessary to increase their participation; and
x) Investigation of "best practices" in other marine jurisdictions.

[56] Ibid., p.2.
[57] bid., p. 22.

Appendix A – Survey

Name of Organization:	
Contact Person's Name:	
Contact Person's Title:	
Address:	
Telephone Number:	
E-Mail Address:	
Date(s) of Interview:	

1. Please identify the industry sectors in which your company works, the number of vessels in each category and the percentage of the year the vessels are in operation.

	Marine Transportation Industry	**No. of Vessels in each Category**	**Percentage of the year in Operation**		**Offshore Petroleum Industry (All phases in Eastern Canada)**	**No. of Vessels in each Category**	**Percentage of the year in Operation**
	Freight and/or Passenger Water Transport				Project Owner/Operator		
	Ferry (Federal & Provincial)				Drilling/Well Development		
	Marine Towing				Supply and Standby Vessels		
	Piloting Service, Water Transport				Seismic and Chase Vessels		
	Government Fleet (CCG)				Petroleum Product Carriers/Tankers		
	Crew Recruiting				Crew Recruiting		

2. What is the geographic scope of your operations? What percentage of your operation occurs in each geographic location?

Area of Operations	100%	99-75%	74-50%	49-25%	24-1%	N/A
Eastern Canada (the Great Lakes, the St. Lawrence Seaway and Atlantic Canada)						
National						
International						

Occupational Demand

3. Referring to the Marine Transportation and Offshore Petroleum Industries Employment Matrix identify, the at-sea and shore-based employment for your company:

   The number of persons employed in each occupation in the current year – 2003:
   The number of persons expected to be employed in each occupation in 5 and 10 years, respectively 2008 and 2013;
   Identify the number of persons receiving training as cadets in each of the years;
   Identify the number of persons used to provide back-up for absences such as illness, training, etc.;

4. Identify any assumptions underlying the number of persons expected to be employed in 2008 and 2013 (e.g., increases or decreases in the number of vessels);

5. Identify the number of employees in each of the following age groupings:

Occupation/Age	Under 31 years	31-40 years	41-50 years	51-55 years	Over 55 years
Deck Officers					
Master Mariner					
Master, Intermediate Voyage					
First Mate, Intermediate Voyage					
Command Endorsement, 350 tonne					
Command Endorsement, 3000 tonne					
Watchkeeping Mate, Unrestricted					
Watchkeeping Mate, Restricted					
Other					
Engineering Officers					
First Class Marine Engineer					
Second Class Marine Engineer					
Third Class Marine Engineer					
Fourth Class Marine Engineer					
Other					
Total					

5a. What is the average age of Deck Officer retirees over the last 5 years?

5b. What is the average age of Engineering retirees over the last 5 years?

5c. What number of officers is expected to leave at-sea positions (retire, take shore-based employment, etc.)?

	2003	2004-2008	2009-2013
Deck Officers			
Engineering Officers			
Total Officers Retiring			

5d. What number of officers is expected to leave at-sea positions to seek at-sea positions with other companies?

	2003	2004-2008	2009-2013
Deck Officers			
Engineering Officers			
Total Officers Retiring			

Occupational Supply

6. What is the **home** residence of your on-board personnel by province?

Number of On-Board Personnel by Province										
NL	NS	NB	PEI	Que	ON	AB	Sask	Man	BC	NWT/Nunavet

7. What initiatives does your company participate in with training institutions or others to fill entry-level positions? How many trainee positions do you offer per year? How many entry-level positions do you recruit per year?

8. Do you typically recruit entry-level recruits:
   Internally;
   Externally; or
   Internally and externally?

8a. In terms of external recruitment of entry-level recruits, where do you recruit?

   Eastern Canada;
   Nationally;
   Internationally;
   Institutions – Please specify:_____

9. Where do you typically recruit experienced recruits?

   Internally;
   Externally;
   Internally and externally;
   Eastern Canada;
   Nationally;
   Internationally;

10. What is the typical employment status of on-board personnel e.g., full-time permanent (f/t p), part-time permanent (p/t p), full-time seasonal (f/t s) or part-time seasonal (p/t s)?

    Record in the columns **F/T P, P/T P, F/T S, P/T S** of the Marine Transportation and Offshore Petroleum Industries Employment Matrix

11. How many females are employed in at-sea occupations? In which occupations?

11a. What are the barriers to employment of females in at-sea occupations?

11b. How many females are employed in shore-based occupations, which require marine specific training? In which occupations?

12. What positions are most difficult to recruit (dtr/c)? Why are these positions difficult to recruit?

    Record in the column **DTR/c** on the Marine Transportation and Offshore Petroleum Industry Employment Matrix.

12a. What factors affect personnel recruitment (i.e., barriers, perception, availability of training, access to training, quality of training, work environment, etc.)?

13. What positions are most difficult to retain (dtr/t)?

    Record in the column **DTR/t** of the Employment Matrix.

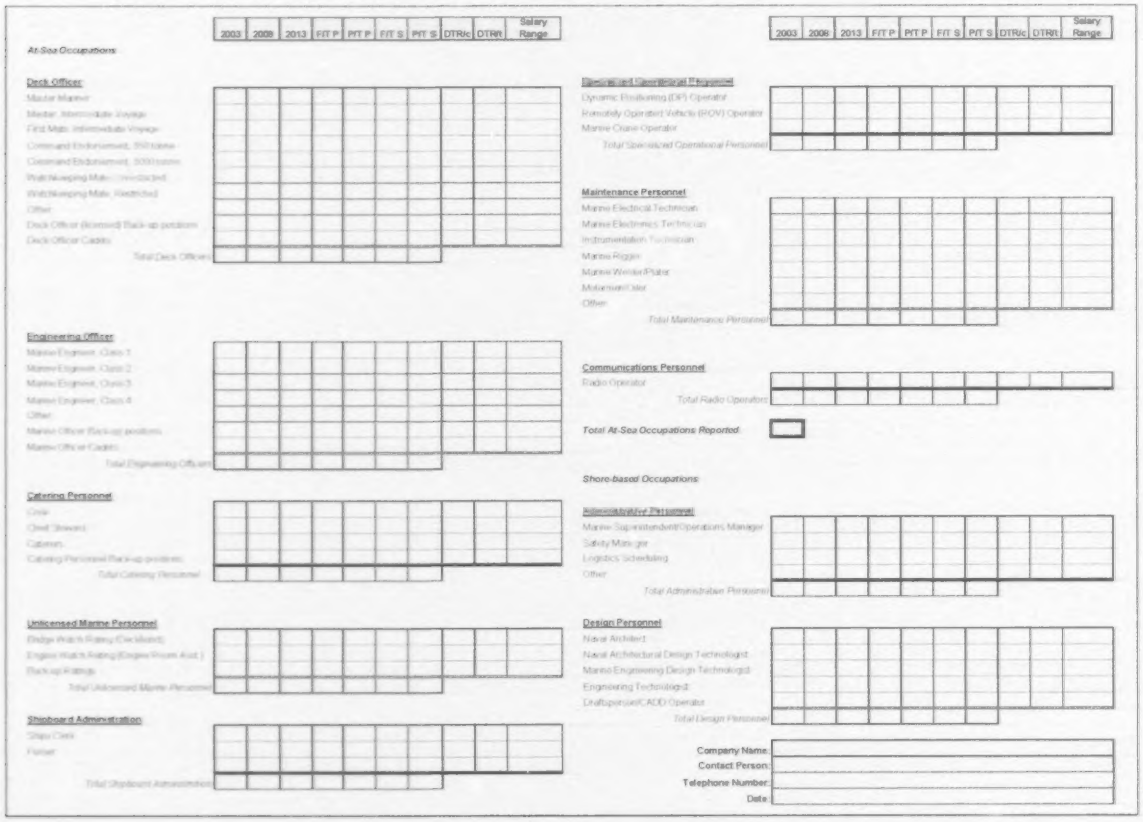
13a. What factors affect personnel retention?

14. What factors will affect current and projected marine personnel demand and supply in Eastern Canada (e.g., availability of appropriate HRD strategies, concurrent major projects, industry specific requirements, etc.)

15. What initiatives, if any are being utilized by the company to address existing or anticipated occupational supply shortages?

16. What is the salary range for each of the occupations?

Record in the column **Salary Range** on the Marine Transportation and Offshore Petroleum Industries Employment Matrix.



Appendix B – Training Institutions Interview Guide

Name of Organization:	
Contact Person's Name:	
Contact Person's Title:	
Address:	
Telephone Number:	
E-Mail Address:	
Date(s) of Interview:	

1. Please identify the deck and engineering officer programs offered by your institution and the number of students enrolled per year. In the second to last column, please record the duration of the program. In the last column, please record the % of graduate placement 18 months after graduation for each of the programs.

Deck and Engineering Officer Programs	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Duration of Program	% Graduate Placement
Deck Officer (Cadet) Program															
No. Enrolled															
No. Graduates															
Engineering Officer (Cadet) Program															
No. Enrolled															
No. Graduates															
Deck Officer Transport Canada Certification Program															

Deck and Engineering Officer Programs	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Duration of Program	% Graduate Placement
No. Enrolled															
No. Graduates															
Engineering Officer Transport Canada Certification Program															
No. Enrolled															
No. Graduates															
Naval Architecture Program															
No. Enrolled															
No. Graduates															
Maritime Engineering Systems Design Program															
No. Enrolled															
No. Graduates															
Other Marine or Offshore Programs of greater than 12 months duration															

2. Is your institution planning to offer any new deck or engineering officer programs in the next 5 years?

   Yes No

3. If yes to question 2, what new programs will be offered? Please identify the anticipated duration of each of the programs.

New Deck or Engineering Officer Programs to be Offered	Duration of the Program

4. What student recruitment strategies do you use?

Appendix C – NAICS Descriptions

484 Water Transportation

This subsector comprises establishments primarily engaged in the water transportation of passengers and goods, using equipment designed for these purposes. Exclusion of establishments primarily engaged in same-day return sightseeing trips and cruises (48721, Scenic and Sightseeing Transportation, Water).

4831 Deep Sea, Coastal and Great Lakes Water Transportation

This industry group comprises establishments primarily engaged in deep sea, coastal and Great Lakes water transportation of freight and passengers. The St. Lawrence Seaway is considered to be part of the Great Lakes system. Establishments that operate ocean-going cruise ships are included.

211 Oil and Gas Extraction

This subsector comprises establishment primarily engaged in operating oil and gas field properties. Such activities may include exploration for crude petroleum and natural gas: drilling, completing and equipping wells; operating separators emulsion breakers, desilting equipment and field gathering lines for crude petroleum; and all other activities in the preparation of oil and gas up to the point of shipment from the producing property. This subsector includes the production of oil, the mining and extraction of oil from oil shale and oil sands, and the production of gas and hydrocarbon liquids, through gasification, liquefaction and pyrolysis of coal at the same time.

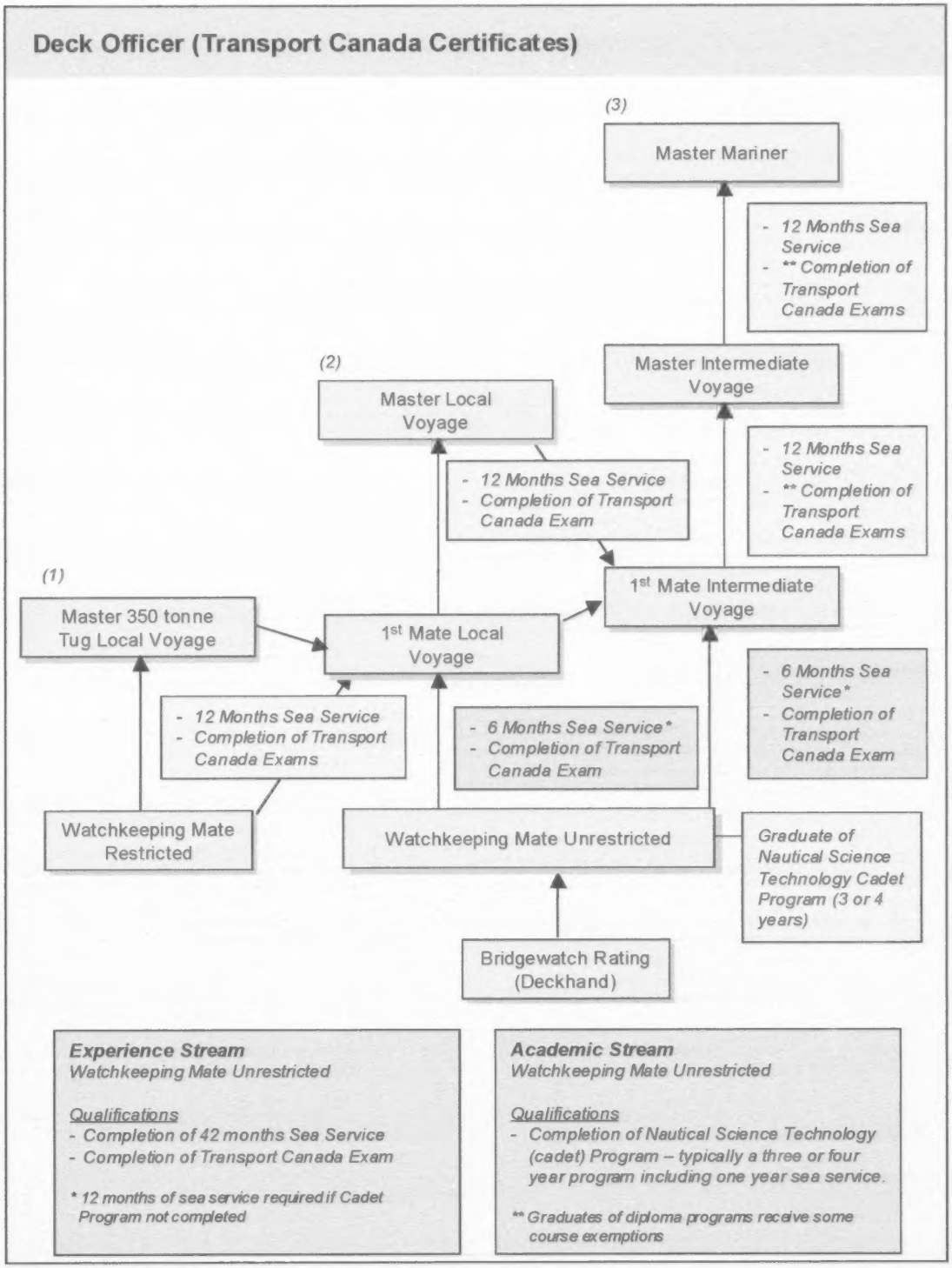
213 Support Activities for Mining and Oil and Gas Extraction

This subsector comprises establishments primarily engaged in providing support services, on a contract or fee basis, required for the mining and quarrying of minerals and for the extraction of oil and gas. Establishments engaged in the exploration for minerals, other than oil and gas, are included. Exploration includes traditional prospecting methods, such as taking ore samples and making geological observation at prospective sites.

3366 Ship and Boat Building

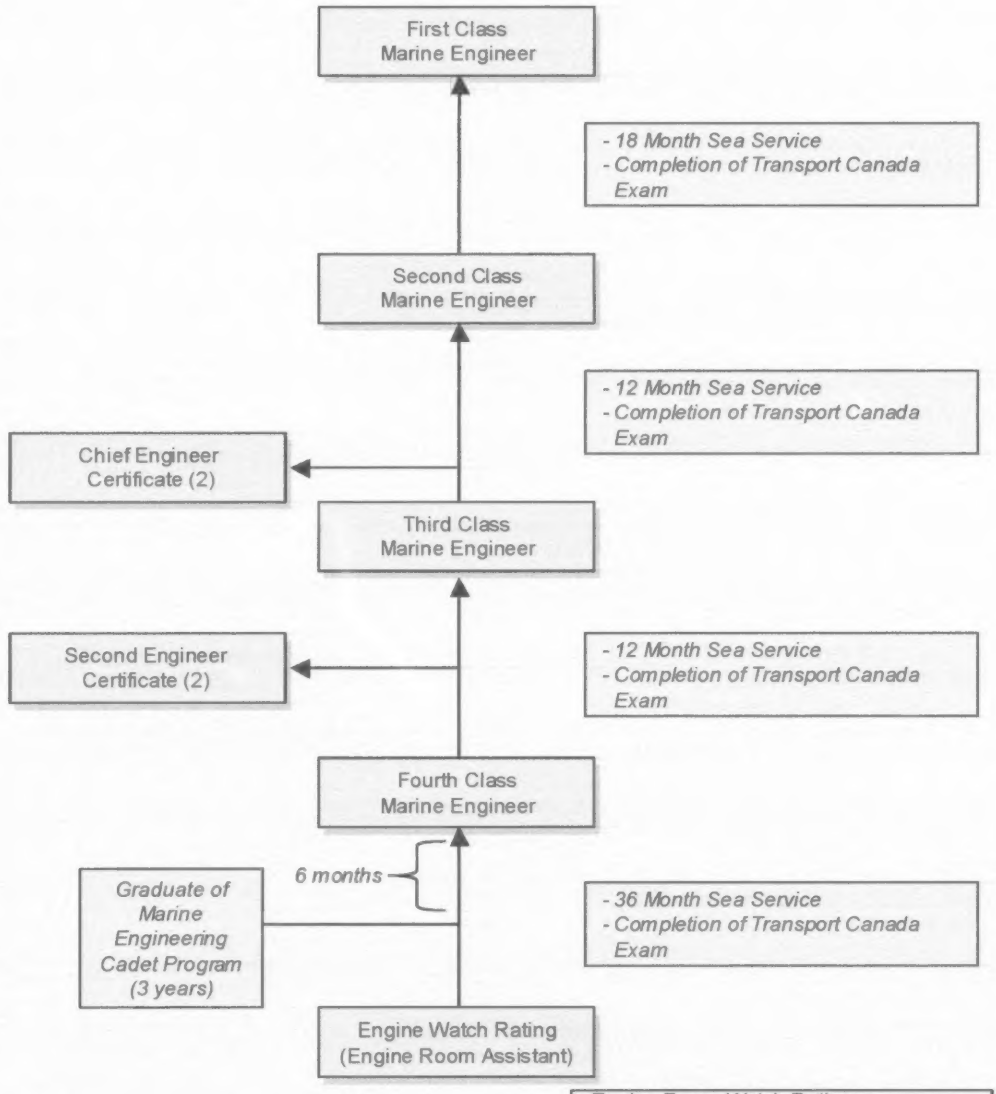
This industry group comprises establishments primarily engaged in operating a shipyard or manufacturing boats. Shipyards are fixed facilities with dry docks and fabrication equipment capable of building a ship, defined as water-craft suitable or intended for other than personal or recreational use. The activities of shipyards include the construction of ships, their repair, conversion and alteration, the production of prefabricated ship sections and barge sections, and specialized services, such as ship scaling, when performed at the shipyard.

Appendix D – Deck Officer Career Path


Deck Officer (Transport Canada Certificates)
(3)
Master Mariner
- 12 Months Sea Service
- ** Completion of Transport Canada Exams
(2)
Master Local Voyage
Master Intermediate Voyage
- 12 Months Sea Service
- Completion of Transport Canada Exam
- 12 Months Sea Service
- ** Completion of Transport Canada Exams
(1)
Master 350 tonne Tug Local Voyage
1st Mate Local Voyage
1st Mate Intermediate Voyage
- 12 Months Sea Service
- Completion of Transport Canada Exams
- 6 Months Sea Service*
- Completion of Transport Canada Exam
- 6 Months Sea Service*
- Completion of Transport Canada Exam
Watchkeeping Mate Restricted
Watchkeeping Mate Unrestricted
Graduate of Nautical Science Technology Cadet Program (3 or 4 years)
Bridgewatch Rating (Deckhand)
Experience Stream
Watchkeeping Mate Unrestricted
Qualifications
- Completion of 42 months Sea Service
- Completion of Transport Canada Exam
* 12 months of sea service required if Cadet Program not completed
Academic Stream
Watchkeeping Mate Unrestricted
Qualifications
- Completion of Nautical Science Technology (cadet) Program – typically a three or four year program including one year sea service.
** Graduates of diploma programs receive some course exemptions

Appendix E – Engineering Officer Career Path

Engineering Officer (Transport Canada Certificates)


First Class Marine Engineer
- 18 Month Sea Service
- Completion of Transport Canada Exam
Second Class Marine Engineer
- 12 Month Sea Service
- Completion of Transport Canada Exam
Chief Engineer Certificate (2)
Third Class Marine Engineer
Second Engineer Certificate (2)
- 12 Month Sea Service
- Completion of Transport Canada Exam
Fourth Class Marine Engineer
6 months
Graduate of Marine Engineering Cadet Program (3 years)
- 36 Month Sea Service
- Completion of Transport Canada Exam
Engine Watch Rating (Engine Room Assistant)
Engine Room Watch Rating
Qualifications
- 9 months Marine Diesel Mechanics Course
- 90 days sea service required
- Completion of Transport Canada Exam

(1) Also referred to as "Oilers" & "Fitters"

(2) Both of these Certificates are rarely issued, are of limited validity, and Transport Canada plans on phasing them out.

Note: This career path is used for both the Motor and the Steam Engineer Certificates.

Bibliography

BIMCO/ISF 2000 – Manpower Update - The Worldwide Demand for and Supply of Seafarers. Institute for Employment Research, University of Warwick. (Apr. 2000).

Fisheries and Marine Institute of Memorial University of Newfoundland. (June 1999). *Here the Tides Flow – Career Opportunities in the Marine Transportation Industry.* St. John's: Marine Institute.

Niagara College, Canada. (July 2000). *Making Waves – A Profile of Career Opportunities in Niagara's Marine Sector.* Niagara-on-the-Lake: Niagara College.

Petroleum Industry Human Resources Committee. (May 2003). *Labour Market Assessment of the Offshore Oil and Gas Industry Supply and Service Sector in Newfoundland and Labrador.* St. John's, NL: Petroleum Industry Human Resources Committee.

Petroleum Industry Human Resources Committee. (May 2003). Presentation and Discussion of the Study *"Labour Market Assessment of the Offshore Oil and Gas Industry Supply and Service Sector in Newfoundland and Labrador".* St. John's, NL: Petroleum Industry Human Resources Committee.

Praxis Research and Consulting Inc. for HRP/HRDC (Mar. 2003). *A Long Way Back – A Situational Analysis of Human Resource Issues in the Shipbuilding and Industrial Marine Industry in Canada.* Ottawa: Human Resources Development Canada.

Sectoral Committee of the Quebec Marine Industry. (June 2002). Executive Summary of *Sectoral Profile – "Let's Not Miss the Boat".*

Marine Careers Secretariat